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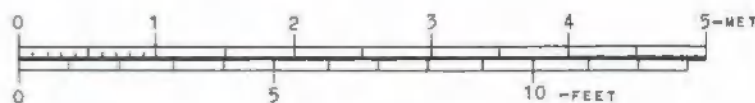
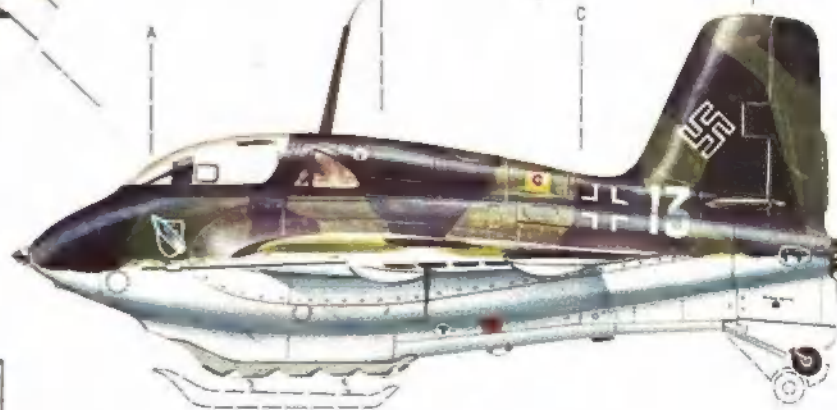
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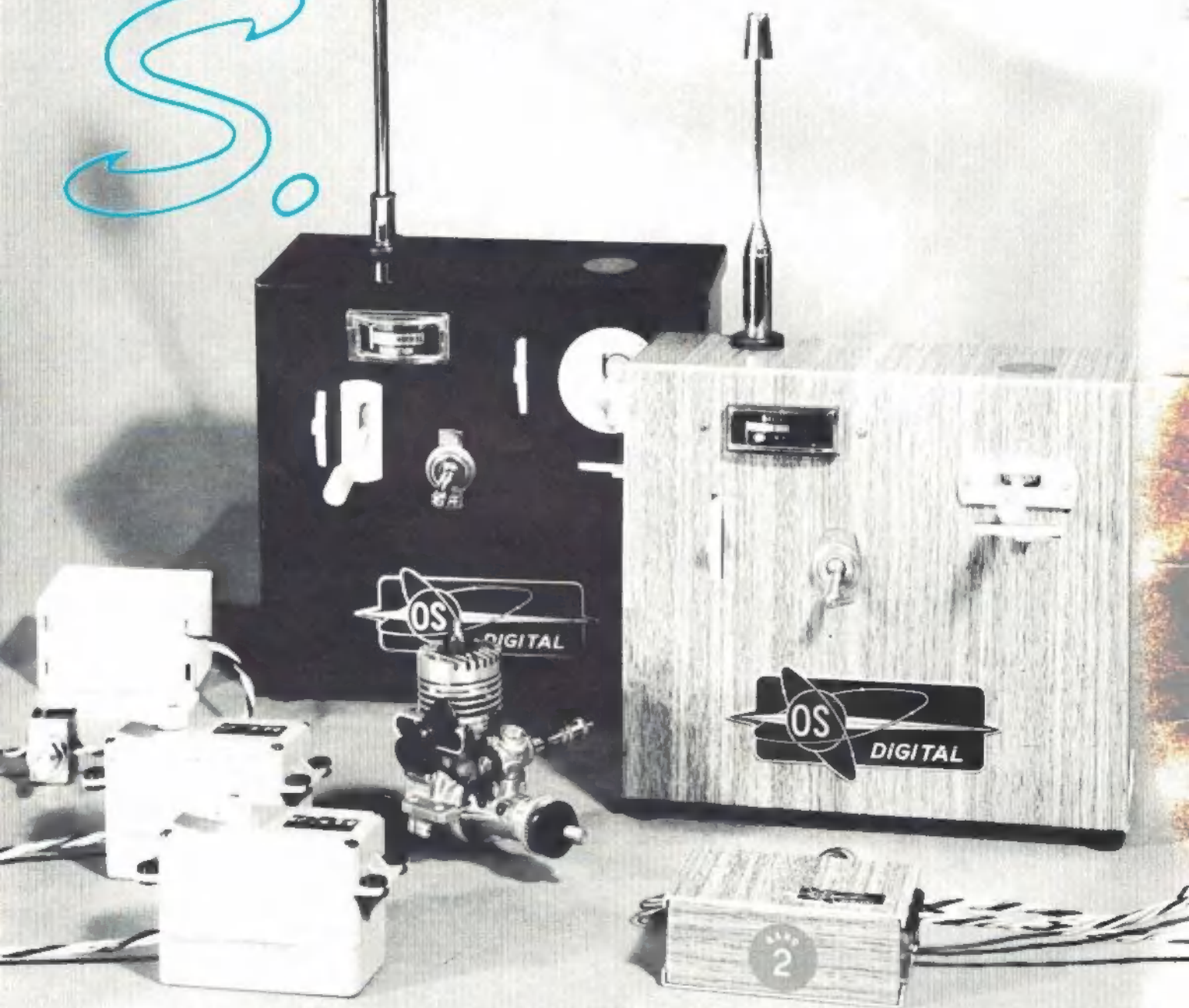


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VOLUME 69, NUMBER 1

JULY 1969

COVER PHOTO: WW-II Messerschmitt Me.163B-1A Komet, first rocket interceptor: top of 595 mph, climb to 40,000 ft., 3.35 min. A 3800-lb.-thrust Walter liquid-fueled engine ran eight minutes. Bjorn Karlstrom painting.

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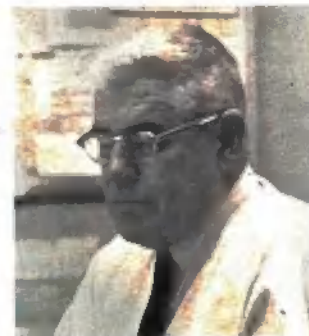
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## STRAIGHT AND LEVEL



**Big or little, airplanes are both simple and complex. Sometimes we forget how simple things can be.**

AN airplane is a surf-board skimming a sea of air. A kite with its motor tied to the center of the earth. It is a B-70, a swing-wing F-111, supersonic projectiles which man could not have flown without his computers. Something as simple as a paper dart, or as complex as a coke-bottle fuselaged delta with a mighty turbine and roaring afterburner.

A model airplane is a couple of pieces of sheet balsa and a hard strip to fasten them to. A shimmering thin piece of film spread upon the water, and laid over a spiderweb frame without dope or glue. A slow-turning prop that goes tick-tock. A \$5000 roaring package of electronics and gismos cocooned in foam rubber.

It does not necessarily take a fortune to make a flying machine. The home-builders who put together, over two years of evenings and weekends, a Tradewind or an E.A.A. Bipe, prove that. So does the indoor builder who sands and polishes from magnificent white balsa a dream of a hand-launched glider that faultlessly circles for well over a minute.

And this is something we need to think about radio-control, especially you 13-to-14-year-olds with your paper routes, and lawns to cut in the hot sun. An R/C crate is a box with a dihedralled high wing and maybe only a noisy 02 on the nose. As well as a skinned-foam-winged bullet that goes zip-zip-zip when you tug on the lever switches. It is a shaking Galloping Ghoster as well as a smooth-as-silk full-houser. A two-function digital as well as a seven-function black or red or green box. No matter what it is, it does something better than any other gadget, widget, or system. The crate you put it in does its bit with elan. And because it does, its owner can get his kicks—if only someone would tell him so!

To our way of thinking, the incomparable achievement in radio-control is not the costly system which puts down the flaps, tramps on the brakes, or trims the pilot's helmet. It is the two-function little thing which smoothly proportions a rudder and elevator on a glider, or rudder and engine throttle on a powered craft. That steers a boat with the best of 'em and governs that howling engine as well. That steers a race car, controls the power and even puts on the brakes. Or haven't you noticed what has been happening to "traditional" single channel?

Two-function digital (and all sorts of Galloping Ghost) prices most of us into, not out of, the hobby. It has taken us from escapements and motorized escapements, or servos if that confuses you, into a wonderful world of enjoyment. It has opened up the skies to anyone with the sense to grasp what it offers.

Everything—bar none—has its limitations. All radios, all crates, big and little, offer something good you

can't find in anything else. The grooving multi's that fly on a string; why you can't feel the air with them! You can with a little flat-bottomed-winger. It's alive! By itself, man, inspired by the substance of invisible forces—the little risers, and bumps, and the reactions to what you tell it to do. The craft wants to do things that a multi man does not understand—he'd cuss them. But play them, and the wind, and the ship is a cork come to life.

Flying it is an art. Play it right and you unlock the secrets of bouyant flight. The crate flies like the birds, for it must be totally stable. It has an independence. It can take care of itself and somehow, you admire that as you watch, and it is a challenge. You against the elemental forces of nature and of flight. Like catching a big fish with a thin line. A rope spoils the fun.

You know, too, when you are good at it. Someday a soaring hawk or some sea bird effortlessly plying the wind, will catch your eye. Watch the bird circle, gain altitude. Think rudder! When the bird responds to rudder just when and how you think he should (OK, maybe it's a she, but who cares?), and you find yourself praising his perfect control, just held so long, then taken off, just as you'd do it, then you've earned your wings.

That's a wee part of it. What makes it magic is a loving to watch an airplane fly. A sense of feel. Feel for a ship on its own, yet under control. You do feel it. No mistake about that. Throw it around, force it, and you'll note nothing. Make it an extension of your senses, and suddenly you are in it. There is no earth around you, just you and your handicraft up there, alone. Oh, you can fly multi, too. It's exciting, different. Yet what it is different from, must be different too. Q.E.D.

There's a world of pleasure in the simple, cheap stuff. Fun and satisfaction is where you find it—or make it. And that goes for boats, cars, and planes. With so many guys eating their hearts out these days for nothing but the "best" and the most expensive, there's a fearsome wastage. The "thing" is to get into it anyway you can. If the 45 stunter is too costly and too risky, build a Ringmaster. If the FAI free-flight is an expensive bomb, fly sport with a Half A. Or a tow-line glider. Or try making a really good hand-launch glider or an ROG. Do something, anything. Everything is good.

Why must model airplanes be such a problem to the beginner? Why can't the beginner just get started? Personally, we'd rather watch Phil Kraft than be Phil Kraft—which would be pretty good, too, come to think of it! *Publisher's note: Do you have a model design you'd like to see published? American Aircraft Modeler is looking for all types of designs, articles and plans. If you have an idea, just drop us a line!*

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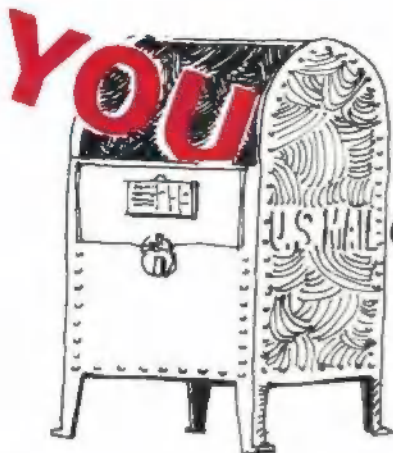
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### Many thanks

I have enjoyed your magazine for a year now, and I am happy to subscribe again.

I am glad to see you are printing articles for the Tenderfoot, and hope you will continue.

Paul Grammens, Glen Ellen, Calif.

### Why not use films?

My sixth-grade class has been introduced to model-building as part of a unit on weather and space. We began by building six-inch gliders made of oak tag with balsa fuselages. All flying control surfaces were labeled and made movable so that students could become familiar with their name and function.

In this way, it was easier to see the effect of elevator or an aileron-produced roll. Later, we built 18- and 20-inch hand-launched gliders. Again oak tag was used on the stabilizer as it is cheap, available, and can be adjusted.

Your "For the Tenderfoot" articles are just the thing for beginners. There have been dozens of the rubber models made from your December issue. I duplicated the plans on the mimeograph machine and was surprised to find the demand almost equally as heavy from the girls as the boys.

Almost all these models flew well and about 25 were among the entries in a contest held in the gymnasium last Friday.

One of the big inspirational events of the program was the showing of Mr. Frank's films "The Long Flight." The film, concentrating on the building and flying of rubber models was an encouragement to those who wondered how to use paper covering, and curious how well rubber could really fly.

This brings me to think of one big question. Nearly every industry that has any product to sell has a film available to schools discussing their product and its use. These films make quite an impression on children. Why isn't the model industry taking advantage of this excellent opportunity to alert millions of youngsters and give them needed advice?

Howard Hutton, Hopatcong, N. J.

### Real aircraft

Several of us (real aircraft pilots) have decided to build a full-size glider. We wish to build a two-place powered version, but have no idea where we might obtain the plans and specifications. If you have information in this respect, please let me know.

It all started when I took my model "Baron" to the airport. It is a beautiful ship with that 8½-ft. span, and it is close to the scale of the Berguette 903. The fel-

lows have built a couple of full-size planes here at Antigo, and at the Merrill airport some time back, but now they all want a powered glider. See what a fuss a model can make.

One more comment. Your magazine is tops. I sure missed a lot in not subscribing to it years ago. It's almost impossible to get from the bookstores. I'd get it at twice the cost.

Tony Michael, Bryant, Wis.

### Mini-Glider mod

I have enclosed print of my modification of John Zaic's Mini-Glider. While the modification misses the point of John's article, it is more in keeping with what I like in a glider.

Materials will be ¼" for the wing and stab and ⅛" for the fuselage and rudder. The ¼" wing material to be bent to an airfoil shape per Gordan Cain indoor glider. This modification to twice or three times this size should make a good indoor glider.

John's article was excellent. I shall try his idea of Scotch tape on the tip to try to get my indoor glider to show ~~marked~~ turn

for me. I prefer the squared-off version of the Mini-Glider. Perhaps this liking for square tips goes back to J. S. Luck's articles on model Reynolds numbers. (Or is it just plain laziness?) Also, here is a picture of my version of the John Zaic glider. It glides fast, in a left turn, but cannot be thrown. With a throw of any force it does a couple of snap rolls before settling down into its left glide.

Whether this is size or design, I can't tell so the next one will be 12"-span to check the result of size on the design.

Sears B. McCarrison, Mattapan, Mass.

### More indoor models

As I'm mainly interested in R/C for summer sport flying, I am left stranded during the winter months. Some of the members of the club that I belong to have been interested in indoor for quite a number of years and it has become fairly contagious throughout our club.

Seeing that your magazine is devoted to all types of aircraft modeling, I'm not alone in begging for some indoor articles. AMA magazine seems to give aid to plastic model-builders who don't even belong to AMA, while indoor modelers who do be-





long, fail completely to get support.

I personally feel that plastic modeling doesn't require any skill except a steady paint brush.

Indoor modelers pay \$10 a year for rarely used insurance and unread magazines. Hope something will come from this besides a lot of talk.

Larry Smith, Rochester, N. Y.

AAM is equally interested in all forms of modeling. Unfortunately, indoor modelers submit perhaps one article in a two-year period. Bud Tenny's excellent article and plan on the Easy B is a fine example of what we'd like to publish. Articles are needed on techniques—for example, the making of microfilm. Whatever we publish requires dependable contributors. Scale Techniques for the Plastic Modeler was a series supplied by John Townsley; now that John is out of gas, we shall be looking for plastic model as well as indoor contributors. For that matter we required more free-flight. And control-line.

Whether or not liability insurance is required by indoor-modeler members of AMA, is a matter between AMA and its members. As long as more scientifically minded, expert modelers bury all their material in small, controlled-circulation newsletters, why expect the general, several-hundred-times-as-big magazines to be able to publish anything. It is either buried or shown to the world. Ed.

#### Editor was spoofing

I noticed in the "You Said It" column, March '69 issue, that a 1000-page issue will be introduced for \$10 a copy.

Can I order this issue directly from you? I don't think any local hobby shops or bookstores will handle this issue.

Tim Egan, Boulder, Colo.

The point was that it would take such a magazine to publish all the things every modeler demands every month—a patent impossibility. Ed.

#### Not in this category

I feel I must take issue with your March '69 editorial concerning junior participation in R/C. I agree with you on the point that we (the modelers) and industry should do something. However, I am hard-pressed to offer a solution.

I do think that your attack on the club and adult modeler was unwarranted. I don't consider advice to join a club as being "stupid." I have belonged to four different AMA-chartered clubs and none of them treated juniors with "stoney indifference." On the contrary, every effort was made to entice juniors into the sport of R/C flying.

We reduced dues, offered pools to the flying field, supplied technical help, and in one instance, even completely outfitted a club trainer for beginners' use. Where else than the AMA-chartered club could the young modeler find a larger pool of knowledge and companionship? When you consider the insurance benefits and safety of flying on a controlled site, governed by AMA safety rules, it would be unthinkable to advise differently.

Your editorial, whether intentional or not, is a pretty low blow to the AMA, the chartered club, and individual modeler, who have been as stymied as you in solving the problem. You should reconsider and write an apology.

I have three youngsters of my own and have worked with young people in church

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<b>ACCESSORY</b>  <b>99¢</b>	<b>BADGER AIR</b>  <b>449</b> 1/2" x 1/4" x 1/8" (1/4") 1/2" x 1/4" x 1/8" (1/4")	<b>AERO Model</b>  <b>777</b> <b>777</b> 1/2" x 1/4" x 1/8" (1/4") 1/2" x 1/4" x 1/8" (1/4")	<b>THROTTLE</b>  <b>98¢</b> 1/2" x 1/4" x 1/8" (1/4") 1/2" x 1/4" x 1/8" (1/4")	<b>BLIND MTC. NUTS</b>  <b>20¢</b> 1/2" x 1/4" x 1/8" (1/4") 1/2" x 1/4" x 1/8" (1/4")	<b>SAFETY EYE GUARD</b>  <b>129</b> 1/2" x 1/4" x 1/8" (1/4") 1/2" x 1/4" x 1/8" (1/4")
<b>FLEXIBLE NYLON</b> <b>PUSH ROD</b>  <b>29¢</b> <b>29¢</b> 1/2" x 1/4" x 1/8" (1/4") 1/2" x 1/4" x 1/8" (1/4")	<b>GLUE GUM</b>  <b>29¢</b> 1/2" x 1/4" x 1/8" (1/4") 1/2" x 1/4" x 1/8" (1/4")	<b>SALE</b>  <b>489</b> <b>489</b> 1/2" x 1/4" x 1/8" (1/4") 1/2" x 1/4" x 1/8" (1/4")	<b>3 BLADED NYLON</b>  <b>165</b> 1/2" x 1/4" x 1/8" (1/4") 1/2" x 1/4" x 1/8" (1/4")	<b>RAZOR</b>  <b>89¢</b> 1/2" x 1/4" x 1/8" (1/4") 1/2" x 1/4" x 1/8" (1/4")	<b>SALE</b>  <b>30¢</b> 1/2" x 1/4" x 1/8" (1/4") 1/2" x 1/4" x 1/8" (1/4")
<b>WIRELY</b>  <b>780</b> 1/2" x 1/4" x 1/8" (1/4") 1/2" x 1/4" x 1/8" (1/4")	<b>NYLON PUSHROD</b>  <b>50¢</b> <b>50¢</b> 1/2" x 1/4" x 1/8" (1/4") 1/2" x 1/4" x 1/8" (1/4")	<b>Aero Flash</b>  <b>489</b> 1/2" x 1/4" x 1/8" (1/4") 1/2" x 1/4" x 1/8" (1/4")	<b>G-PAD Re Engine</b>  <b>165</b> 1/2" x 1/4" x 1/8" (1/4") 1/2" x 1/4" x 1/8" (1/4")	<b>STRIPING TAPE</b>  <b>30¢</b> 1/2" x 1/4" x 1/8" (1/4") 1/2" x 1/4" x 1/8" (1/4")	<b>SALE</b>  <b>30¢</b> 1/2" x 1/4" x 1/8" (1/4") 1/2" x 1/4" x 1/8" (1/4")
<b>PEACE PIPE</b>  <b>496</b> 1/2" x 1/4" x 1/8" (1/4") 1/2" x 1/4" x 1/8" (1/4")	<b>FOR PLUGS</b> 				

Order-By-Mail From America's HOBBY CENTER, 146T West 22nd St., New York, N.Y. 10011



# ***Pusher Galore***

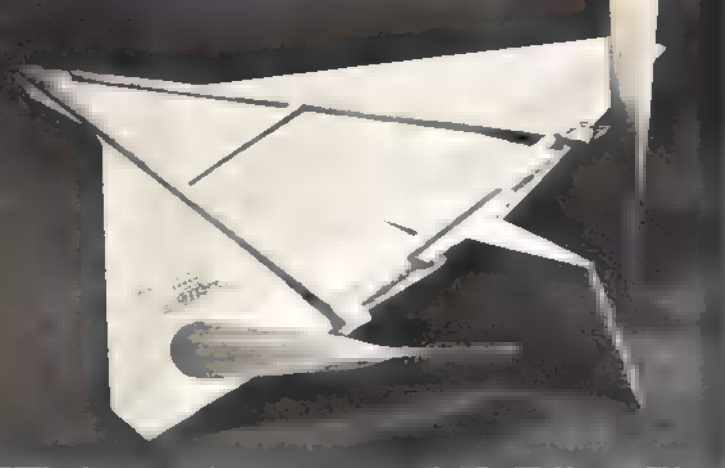
Build your own SST for long-distance flights. Uses a 1910 A-frame twin-pusher and a double-delta wing.

Modified egg-beater simplifies winding by giving equal number of opposite turns to the motors. When launching, release props simultaneously and push forward. By unequal winding or release, you control flight direction.

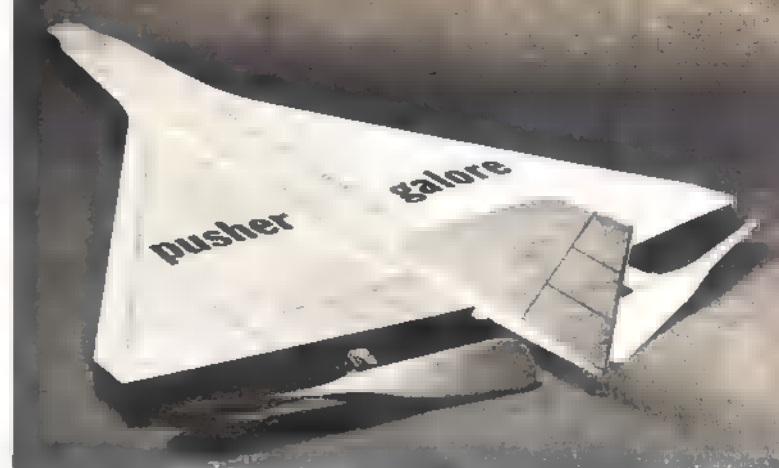
**BILL HANNAN**







Plastic prop bearings are used. Elevator is shimmed.



Sand wing before gluing to frame. Decorate with ball-point pen.

PUSHER Galore represents an interesting paradox, since the top view is that of an ultra-modern supersonic transport, while the flip-side reveals a chassis reminiscent of 1910! Essentially, we have superimposed a double-delta platform on a vintage twin-pusher A-frame. The result is an exceptionally easy-to-build aircraft that is certain to attract attention wherever it is flown.

Before we settle down to the actual construction, it may be of interest to examine the concept of the double-delta more closely. During the initial planning phases for their proposed SST, Lockheed scientists and engineers investigated a large variety of basic layouts, including arrow wings, variable-sweep wings, and canards, before choosing the double-delta configuration. This platform was selected as being the simplest design capable of fulfilling the anticipated requirements. Wind tunnel tests demonstrated that the double-delta could provide very favorable low-speed dynamic characteristics even at extremely high angles of attack, without the need for the structural and mechanical complexities that would be imposed by a swing-wing design. A study of the Lockheed engineering reports, led to the creation of our Pusher Galore, which resembles the Lockheed design (at least from the top!), except for the nose, which has been rounded off for safety reasons.

**Construction:** The basic A-frame structure is made from  $\frac{1}{4}$ " square medium-hard balsa strip, which has been selected for stiffness and straightness. The forward end of each member is cut at an angle, as shown on the drawing, then glued and bound with strong thread. This, by the way, was standard practice on the old twin-pushers. Next, cut the cross-pieces to size, and pin and glue them in place. Be thorough with the glue at all intersections, since they will be subject to strain under full winds of the rubber motors.

The propeller bearing blocks are cut from  $\frac{1}{4} \times \frac{3}{8}$ " rock-hard strip balsa stock, which is drilled to accept  $\frac{1}{16}$ " diameter metal tubing bearings. The tubing should be roughened on the exterior wall, coated liberally with Ambroid or epoxy, and installed.

Be certain to remove any glue that may find its way into the inside of the tubing. The bearing blocks may then be glued and bound to the outer ends of the A-frame structure. As an alternative scheme, you may cut down the thickness of the A-frame members at the rear, and utilize the plastic bearing assemblies from ready-to-fly ROG models, such as the North Pacific "Sleek Streak."

Bind the forward rubber-motor hooks from a piece of  $\frac{1}{16}$ " diameter music wire, and glue and bind in place. Though not

strictly necessary, the A-frame members may now be sanded to half-round contour, streamline, reduce weight, and add to workmanlike appearance.

**Wing:** The wing is made from fairly light  $\frac{1}{16}$ " sheet balsa, edge-glued to make up the necessary size. Obviously, the desired result may be achieved with other patterns of joints, but the method shown on the plans has proven quite warp-resistant, and can utilize 3"-wide sheets. Note that the elevons overlap the trailing edge "tabs" of the wing center-section, and are glued initially only at their leading edges. During flight testing, small balsa shims will be inserted between the elevons and center-section tabs to increase the upward deflection as needed.

**Propellers:** Don't be afraid to tackle construction of the pair of props for this bird, because we have used a method that is simple enough to be carried out by even a young child! While "serious" modelers may look at this of  $\frac{1}{16}$ " with raised eyebrows, the fact remains that these rather crude appearing really do the job. Each prop is constructed from eight  $\frac{1}{16}$ " thick  $\frac{1}{4}$ " wide  $5\frac{1}{2}$ " long, hard balsa strips. Each strip is punctured at its exact center with a straight pin, and then all eight strips are stacked in a pile, using the straight pin as an alignment guide. Put a layer of glue between each mating strip, fan them out as shown on the drawing, and set aside to dry, preferably overnight. **Caution:** Be sure to make one left-hand and one right-hand prop blank, unless you want your SST to do snap-rolls. After the funny-looking stacks of sticks have dried, they may be carved and sanded to finished shape. After rounding the tips, give each prop two or three coats of clear dope, sanding between coats. Presto! They may be ugly, but they work. Bend a pair of prop hooks from  $\frac{1}{32}$ " diameter music wire, add a couple of thrust washers, and install.

**Vertical fin:** Cut the vertical fin-rudder from a piece of  $\frac{1}{16}$ " sheet balsa. The shape is the least bit critical, so if you feel creative, design your own.

**Assembly:** Glue the wing assembly on the A-frame being careful to center it exactly—with that much gluing area, it would be awfully difficult to shift later. A number of small weights or clamps are useful to hold the wing in place until the glue dries. Next, add the vertical fin, being cautious that it is correctly centered.

**Decor:** Well gang, the hard work is over, and if you want to, you can head for the flying field. However, why not invest one half-hour, and add a little esthetic appeal to your SST? With the aid of a straight edge, a French curve, and a fine-line marking pen, you may really enhance the appearance. You may use our drawings

and photos as a guide, or use your own imagination. One effective approach is to apply colored tissue markings, using clear dope as an adhesive. A couple of light spray coats of clear dope will protect your markings from moisture, but are easy, so as not to encourage warps.

**Flying:** Make up two rubber motors, each consisting of four strands (two loops) of  $\frac{1}{8}$ " flat rubber. With the rubber in place, check the model for balance. Add modeling clay until the balance point is about where shown on the plan. The elevons should be raised by means of balsa shims to about  $\frac{1}{8}$ ", as measured at the inboard trailing edges. Give each propeller a few hand winds, and try a power glide, releasing the model in a level attitude. The SST will probably go up rather suddenly the first time. If it noses up, add a small amount of clay to the nose, inside the junction of the A-frame. If it noses down, insert thicker balsa shims to raise the elevons slightly. Once you have established a reasonably flat power-glide pattern, try about 100 turns in each side and try again.

**Launching technique:** This can best be seen from our photos. The object is to release both props simultaneously, while giving the model a good push. The launch angle is fairly critical. If too steep, the model will stall. If too shallow, the model may fly into the ground under full power, which really makes the splinters fly. Although Pusher Galore is rather stall-resistant, it is by no means stall-proof, as once an extreme nose-up attitude is reached, the elevons are completely blanked-out by the wing, and can't contribute to recovery. Therefore, the idea is to avoid stalling in the first place. If the model exhibits excessive turning tendencies, don't fiddle with the rudder, but instead, bias one propeller by giving it a few extra turns. Using this system, it is a simple matter to steer the model right, left, or straight ahead. (In the old days, most contests were held for distance rather than duration, and twin-pushers usually won, because they could be made to fly in a straight line.)

**Winding:** Although the model may be wound one side at a time with a winder by hand, it is much easier to use a twin-winder. Unless you are lucky enough to have a genuine antique in your attic, you will probably have to make one. This is done by reworking an egg-beater, which can be cheaply obtained at a dime store. Simply remove the beaters, and replace them with hooks, being careful to attach them strongly in order to withstand the pull during winding.

So there you have it, cloudsters. Why not build Pusher Galore and be the first in your neighborhood to fly an SST!

NOTE: THE TRAILING EDGE OF BOTH ELEVATORS (ELEVONS) SHOULD BE RAISED ABOUT  $1/8"$  BY INSERTING BALSA WOOD WEDGES AT THIS POINT AFTER A SATISFACTORY FLIGHT PATTERN HAS BEEN ACHIEVED. THE WEDGES ARE GLUED IN.

POSITION OF PROPELLER ON FINISHED MODEL

BALANCE  
POINT

$1/32"$  DIA  
MUSIC WIRE  
NOSE HOOK

BIND WITH  
THREAD  
AND GLUE

$1/16"$  SHEET BALSA

archaic  
airlines

THE  
PUSHER  
GALORE SST

DESIGNED ■ DRAWN  
BY W.C. HANNAN  
1968



UNASSEMBLED VIEW OF PARTS



PROPELLER (MAKE ONE RIGHT-HAND & ONE LEFT-HAND)

THE VINTAGE METHOD SHOWN ABOVE IS A VERY SIMPLE WAY TO PRODUCE A PAIR OF RATHER CRUDE BUT EFFECTIVE PROPELLERS. EACH PROP IS MADE FROM A STACK OF EIGHT 1/4" x 1/6" HARD Balsa STRIPS. A STRAIGHT PIN IS USED AS AN ALIGNMENT PIVOT. APPLY GLUE BETWEEN EACH LAYER AND SPREAD THE STRIPS AS SHOWN. AFTER EACH STACK IS DRY, CARVE AND SAND TO APPROXIMATELY THE CROSS SECTION SHOWN. FINALLY, ROUND THE TIPS, AND APPLY A COUPLE OF COATS OF CLEAR DOPE. IMPORTANT! BE CERTAIN TO MAKE ONE RIGHT-HAND AND ONE LEFT-HAND PROPELLER!

ENTIRE "WING" IS MADE FROM 1/16" SHEET Balsa

ALL "A" FRAME MEMBERS ARE 1/4" x 1/4" Balsa

1/32" DIA MUSIC WIRE PROPELLER SHAFT (TWO REQUIRED)

BIND WITH THREAD AND GLUE

FLYING: FOUR STRANDS OF 1/8" FLAT RUBBER PER SIDE WERE USED ON THE ORIGINAL MODEL.

THE FIRST FEW FLIGHTS SHOULD BE MADE WITH ONLY A LIMITED NUMBER OF TURNS, UNTIL A SATISFACTORY FLIGHT PATTERN IS ACHIEVED. IT MAY BE NECESSARY TO RAISE OR LOWER BOTH ELEVATORS SLIGHTLY, AND A SMALL AMOUNT OF NOSE BALLAST MAY BE REQUIRED.

THE MODEL SHOULD BE LAUNCHED IN A SLIGHT NOSE-UP ATTITUDE DIRECTLY INTO THE WIND & BOTH PROPS SHOULD BE RELEASED AT ONCE.

THE EASIEST & FASTEST WAY TO WIND THE MODEL IS WITH A TWIN-HOOKED WINDER, WHICH MAY BE MADE FROM A GOOD QUALITY EGG BEATER. THE MODEL MAY BE STEERED BY WINDING ONE SIDE MORE THAN THE OTHER.

HARD Balsa

1/16" O.D. METAL TUBE

BEARING BLOCK

WASHERS

CROSS-SECTION "A" FRAME MEMBER (SAND TO SHAPE AFTER "A" FRAME IS CONSTRUCTED)



positively the thing will never fly...



# Miracle at LeMans

In 1908 Wilbur Wright went to France to prove that he and his brothers were not fools. His flights shook the world.

**DOUGLAS J. INGELLS**

WHEN the 9,000-ton French liner, *Touraine*, docked in the fog at Le Harve, France on Friday, May 29, 1908, an American, Wilbur Wright, co-inventor of the airplane, walked unnoticed down the gangplank. In a short time, he would become the idol of all Europe, of the world for that matter.

A French syndicate was interested in forming a new company to manufacture the Wright Brothers' biplanes on the Continent. The deal involved almost a quarter of a million dollars.

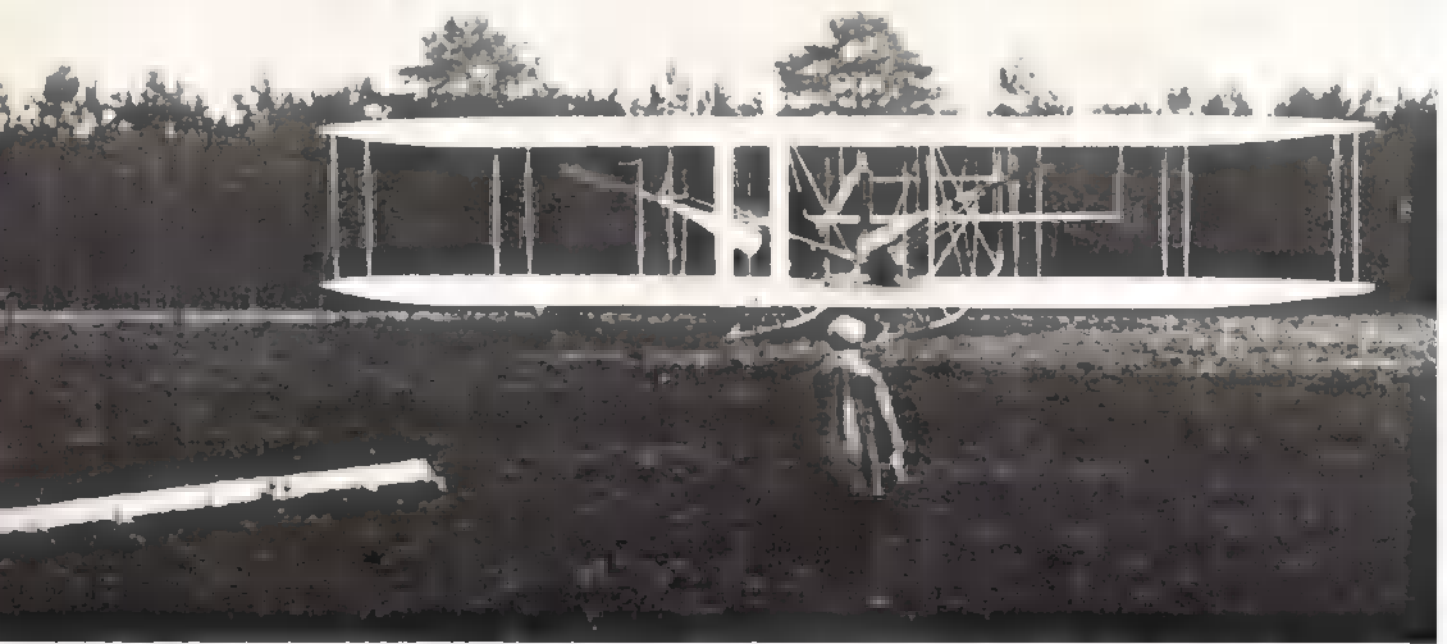
There was only one thing holding up final arrangements. Could the Wright machine perform the way its inventors claimed? Or, was it "le grande bluff," as some Paris newspapers had headlined? Wilbur was in France to prove that they were *flyers*, not *liars*!

He went directly from the southern seaport city to Paris, where he met M. Hart O. Berg, the Wrights' European business representative. Berg had some disturbing news. The bankers were losing interest in light of the recent flights made by Henri Farman, Santos Dumont, Leon DeLagrange, Louis Bleriot, and others who were thrilling all France with their flying exhibitions. National pride was swelling like the ocean tide. History would say France had conquered the sky with the airplane, the same way her famous Montgolfier Brothers had won the sky when they invented the bal-



Time-honored aircraft-engine starting is by flipping the prop(s). Launching system of the Wrights: French flyers used just wheels.





Takeoff from infield of Hunaudieres race track was directly toward nearby trees. Unlike French airplanes, the American machine had good directional control and stability.

loon in 1783. But so much for history!

Who were the Wright Brothers? Where was their machine? Frenchmen had only read stories about the fact that the two brothers had flown successfully in a heavier-than-air flying machine at an isolated place called Kitty Hawk, North Carolina on Dec. 17, 1903.

But that was five years ago, and 5,000 miles away. And it was true that even their own countrymen had refused to believe the Wrights' accomplishments. The American public did not accept the airplane as anything but a fantasy. Even the Wright Brothers' hometown newspaper had carried only a small item about the great event at Kitty Hawk; and that news item said the two inventors had simply emulated the flights of the famous Brazilian aeronaut, Santos Dumont in France. Furthermore, the War Department in Washington had turned down the Wright machine because it didn't believe such a machine **■** in existence!

Naturally, M. Berg was concerned. Why, only ten days before, the great Farman had made a flight of more than a mile in his machine at Issy, France, after which he had challenged the Wrights publicly to a flying contest, personally offering \$5,000 to the winner. Then too, Louis Bleriot was already saying around the Aero Club in Paris that he was making plans **■** fly his monoplane across the English Channel next year. The Wright airplane would have to be something extraordinary, little short of miraculous, to beat the performances of France's own.

Wilbur admitted the Frenchmen had made great progress. But, he pointed out, there was **■** big difference — the French aviators so far had flown only **■** a straight line. Their machines were unstable in the turn, and they lacked controllability. They simply weren't practical vehicles of the air. More important, to achieve the desired control characteristics, the Frenchmen and all others would have to copy the Wrights' patented control features!

M. Berg was impressed, his spirits revived. But how soon would Wilbur be ready to fly?

Well, first, they would have to find **■** suitable "cow pasture" for takeoffs and

landings, Wilbur told him. Then, **■** soon as he could get the machine out of its boxes and assemble it, he would turn the fantasy into fact before ten thousand eyes!

For the next several days, they toured the countryside looking for a suitable flying field, but with little success. Even the so-called "aerodromes" that Farman and Bleriot were using at Issy and Sartrouville and which the two Frenchmen graciously offered **■** their fellow birdman, Wilbur did not find acceptable. This only led **■** growing skepticism.

It was M. Leon Bollee, the famous French automobile manufacturer and designer, who finally **■** to the rescue. He had read in the papers of Wilbur's quest and

he offered the latter the use of the shops at his factory in Le Mans, about 125 miles from Paris, where the plane could be assembled. **■** Bollee also said that he believed there were grounds nearby which would be acceptable for flight operations.

When he saw the Bollee factory, Wilbur immediately decided to take advantage of the shop facilities. He was equally impressed with two sites in the vicinity. One was the artillery test range at Camp d'Auvours. The other was the oval-shaped infield of the race track at Hunaudieres. The Auvours location was ideal, but the French War Ministry refused permission to use it because they were running big gun-tests at the time. M. Nicolai, owner of the race



Wright machine beside the race track at Le Mans. Can anyone explain the reason for **■** forward vertical surface between biplane horizontal stabilizers, instead of two?

track and president of the Jockey Club of Paris, however, said he would be delighted to let the American flyer set up his base there. Berg rented the race course for a fixed monthly fee and a percentage of the gate, if they should choose to charge admissions for the exhibitions.

The plane was shipped by train from Le Harve to the Bollee factory and arrived there on Tuesday, June 17. When Wilbur opened the boxes, he found things inside — "resembling a rattler in a foundry." A dozen of the wing ribs were broken. The linen fabric covering was torn in several places. The radiators were smashed. Part of the seat was broken. A lot of small parts were missing.

It was a week before he and a mechanic, who could understand a little English, but speak less, could effect the necessary repairs and mending. Damp weather complicated the work because it shrunk the fabric wing covering so the cloth could barely be stretched over the framework structure. At one time, when he built a fire pot under the wings to dry them out, Wilbur almost burned up the whole place. In addition, he had to machine the lost parts which could not be found in any of the local hardware establishments.

Wilbur had other troubles, too. Both the Wrights had been in Europe the year before and they had brought the plane over with them. But they never took it out of the crates because negotiations had bogged down. They had, however, taken the engine to the French firm of Bariquand and Mauve to build a copy and make certain improvements. Now, when Wilbur went to Bariquands to inspect the engine, he found they had not finished the new engine, and they had practically ruined the original. It took days to get the American engine running properly.

By the time he had the machine itself in shape, the engine mounted and the propellers geared up, it was the end of July. Things would have moved faster except that Wilbur suffered a painful injury — the Fourth of July when he was running up the engine to test its speed. The rubber hose on the radiator broke and a spout of boiling water scalded him, raising a

blister a foot long on his — and another of equal size on his side. He couldn't possibly fly until the pain and the stiffness were gone.

During his recovery period, Wilbur supervised the final assembly of the machine and the moving of it from the factory to a temporary shed which had been built — the race track. At the same time, work progressed in preparing the launching device which the Wrights used for takeoffs. This was a technique entirely different from anything the French had ever —

The Wright airplane did not take off from the ground properly, but rather from a launching rail and with the assistance of a catapult device. It did not have wheels for its undercarriage like the French machines. The landing gear consisted of runners or skids. The plane rested — a small dolly which ran along a monorail track. The track, wooden 2x4's standing on edge and shod with metal, was laid in a straight line heading into the prevailing wind direction. In addition, there was a tower about 25 feet high with a heavy weight attached to the plane itself by a system of pulleys and ropes. The operator triggered a release mechanism that dropped the weight which, in —, yanked the machine forward, complementing the thrust forces of its propellers. Thus, the machine gained more momentum during the crucial takeoff run. At the same time, the track helped the operator to maintain a straight course into the wind, taking full advantage of the air itself to provide lift for the wings.

Finally, with his arm healing, but still heavily bandaged and a little stiff, and the machine and the launching device — ready — Wilbur announced on Friday, Aug. 7, that he would make a flight the next day. This was his answer to barbed editorials which had been appearing almost daily, interpreting the delays — "stalling."

Since Wilbur had a cot and living quarters, crude but efficient, right in the shed — the — track, he was up early on Saturday making — final check and last-minute adjustments. Testing the engine, it started to act up, sputtering and overheating. But rather than postpone the test, he decided to risk it anyway. Mak-

ing — couple of taxi runs down the track with the propellers racing at slow rpm, he found everything working satisfactorily.

Surveying the ground again, however, he displayed some anxiety when he remarked to M. Berg that the "trees are awful close." He explained he would have to make a quick, and very tricky turn to avoid them.

Neither of the Wrights had flown in such a restricted area. There was plenty of space at Kitty Hawk and at Huffman Prairie near Dayton where they had made all their previous flights. But then, he was banking on the machine's capability to make sharp turns, its inherent controllability, to impress the French.

By noon, there was another disturbing development. It was a bright, clear day, ideal temperature, but suddenly, the wind started blowing in spasmodic gusts of 10 to 15 miles per hour. And it was blowing from the wrong direction, crosswind to the monorail track. If it kept up like this, he would have to call the whole show off. It would be too dangerous to fly in such a high wind.

Since the flight had been highly publicized, a large crowd had gathered, more to witness a failure than see a success. Hundreds had come to see what they did not believe.

High ranking military officers were there, including General M. G. Picquart, the French Minister of War, Commandant Henri Bonel of the Engineering Corps and Captain Louis Ferber, a glider pioneer and a strong advocate in favor of the French Army buying the Wright machine. Also present were prominent members of the Aero Club of France. Among them was Frank S. Lahm, the balloonist and a native of Mansfield, Ohio, who had been living in Paris, and who was chiefly responsible for stirring up interest in the Wright machine as far back — the spring of 1905. It was Lahm, in fact, who had verified reports of the Kitty Hawk flight for the Aero Club, which previously had sluffed off the event — a fraudulent claim.

Newspapermen were all over the grounds. Probably the most prominent of the press representatives was M. Henri Letellier, publisher of the *Le Journal* of Paris. His interest was more than just that of covering the news event; he was — of the principal backers of the syndicate. Naturally, Bleriot, Farman, Delagrangé, and the other aviators had come to see their competition.

Wilbur didn't pay much attention to any of the distinguished spectators, except to greet them cordially. He was too busy with the machine and too worried about the wind conditions. Another concern was keeping the spectators off the infield, away from the machine and its launching mechanism. He didn't want anybody to get hurt.

By one o'clock, the grandstand was black with people. There was much betting, as though they had come to see a horse race. The odds were — high as five-to-one that Wilbur would fail to equal the performance of France's heroes. The delays, due to the wind, which still came in gusts, made the crowd restless and fired its skepticism.

The machine itself, of course, was the focal point of attention. It was a biplane, one wing above the other. The wing span measured about 36 feet. The engine was a gasoline, piston-type, developing about 25 horsepower. It was mounted in the center section of the lower wing. It drove two wide-blade pusher-type propellers made of wood. It was linked to the drive shaft by a chain-drive mechanism similar to the way a bicycle's wheels operate. The body was a skeleton framework of spruce and metal, struts and wires. It measured about — feet

*Continued on page 74*



Wilbur adjusting rudders from ladder. Although quite heavy, this is the first practical and efficient flying machine. Note twin forward vertical surfaces.



Sweeping by in a high-G pylon turn, the Rivets heads for the straight. Perhaps it is not really going 100 mph, but it sure looks like it!



## *.02" Rivets*

Tiny rudder-only version of great Formula-1 pylon racing plane is fast, groovy, and responsive.

### OWEN KAMPEN

THINK small! Until recently the size of an R C model was dictated by the size and weight of its electronic payload. Now with the availability of systems in the 3-ounce or less range, many small models are possible. Rivets is one. True to its prototype, it is small in size but not in performance. It's a mover, fast and responsive, not for slow reflexes and definitely not for the novice.

In this day of big displacement engines, the tiny Cox T.D. 02 powerhouse tends to be regarded as a cute novelty. Don't be misled for this engine-airframe combination can create plenty of excitement on rudder only. While fast, it is also honest, a groover

in the turns, with a flat power-off glide when properly trimmed and balanced.

When designing small planes I have tended to avoid a low-wing configuration for rudder-only use as the need for excessive dihedral tends to destroy scale-like appearance. Being aware of the fact that a sharply raked-back leading edge contributes to dihedral effect I have long considered Rivets as a possible answer.

The T-tail effect was also something I wished to learn more about. It seemed ideal for permitting uninterrupted airflow to the rudder, rather important when that's all you've got. Flight performance has borne this out as this little one really reacts to a command.

Not wanting to re-invent the wheel, use was made of many photos and drawings,

and a special kudo is due Joe Foster for his unknowing contribution. The small one was completed shortly before the '68 Mid-winter Toledo Conference and there received considerable interest from spectators and judges alike.

Surrounded by large ambitious projects, the little Rivets seemed lost but before long it became apparent that it possessed a special appeal. For reasons still not clear, everyone wanted to touch—pet—bounce and hold it. I had thoughts of renaming it "CUDDLES."

Rivets claimed a victory and came home with an award half as large as itself and all was well except for a nagging doubt. Would the cute thing fly? Well, it almost didn't.

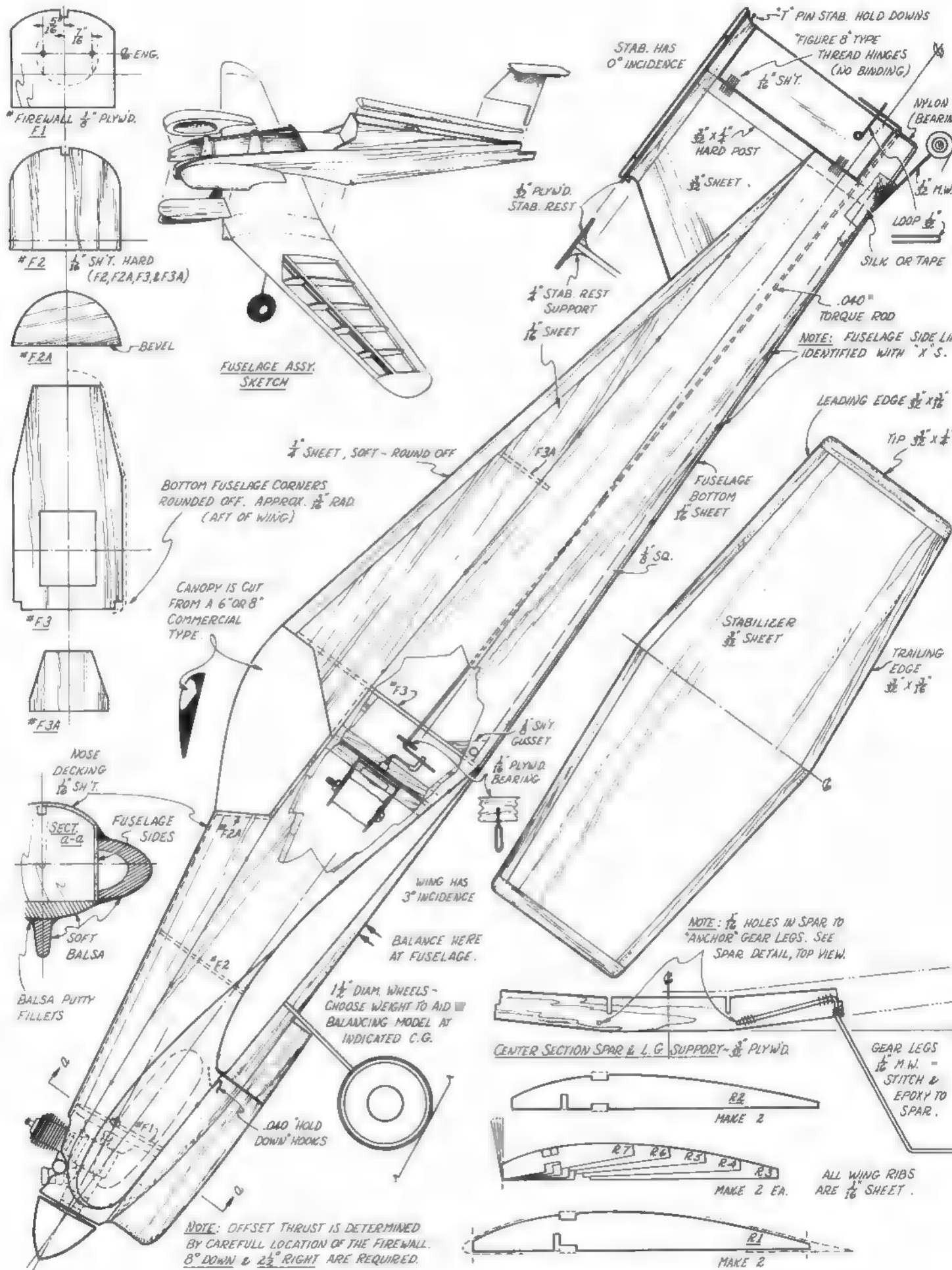
Early attempts with Dick Adams at the controls were borderline at best and at times almost disastrous. Behavior was erratic and at least 150 feet were necessary for recovery from steep spiral dives. One session was enough and Rivets was retired to a hook on the wall—head down in disgrace. I salvaged my damaged pride with the philosophical observation that "you can't win 'em all." It was Rivets' first defeat. For several weeks other projects took priority and Rivets was allowed to gather dust.

All would have ended there had it not been for a visit from Carl Goldberg. After giving his usual fine talk and demonstrations for a record MARCS turnout, we spent a delightful evening together. At one point attention turned to the "hung up" Rivets and its failure to perform. Carl looked things over and then chided me for giving up so easily—for not accepting the challenge of the designers' art. His words really reached me and, feeling a little ashamed, I went back to problem solving.

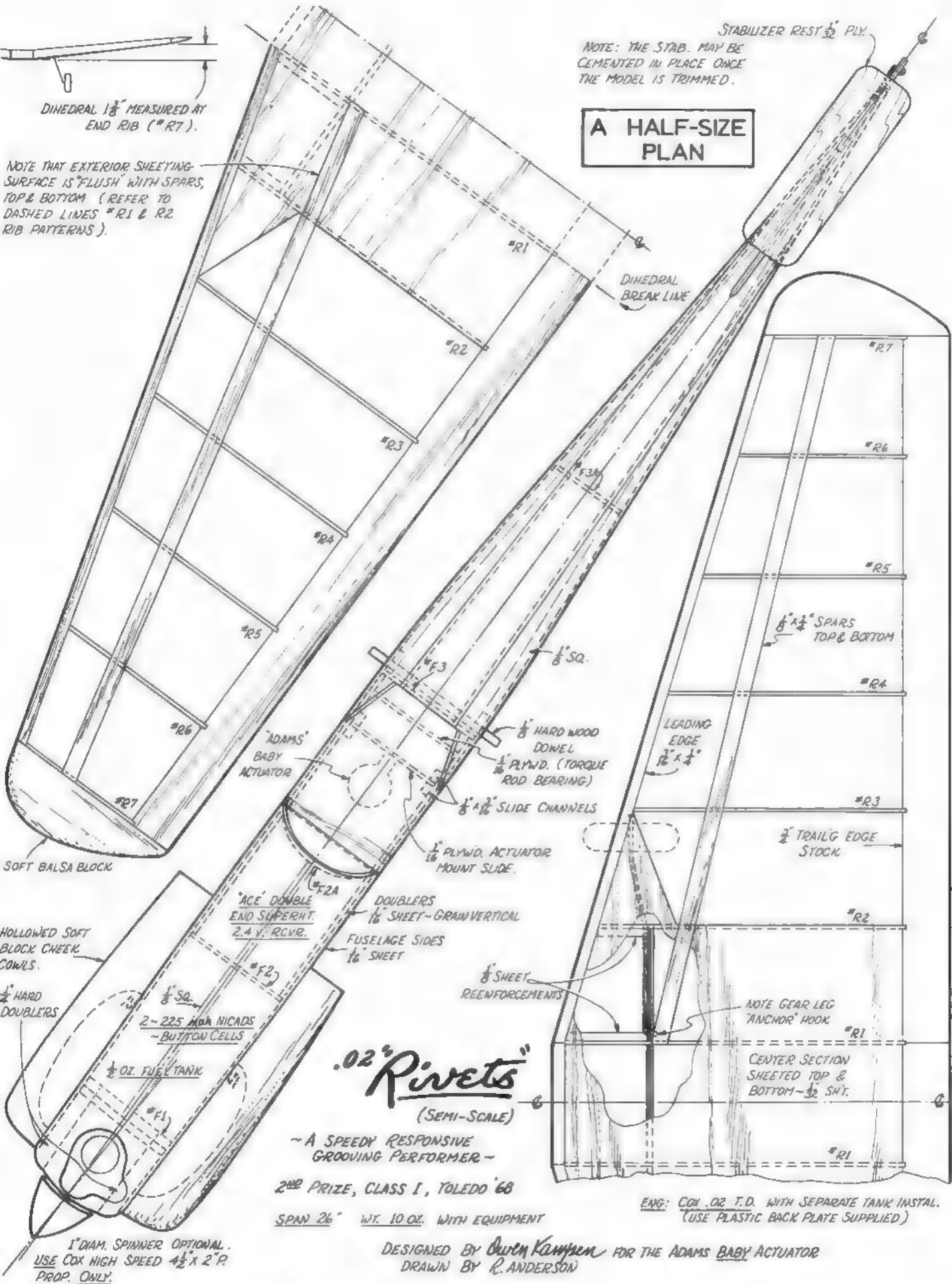
*Continued on page 76*



Real Rivets is a consistent winner. It is of all-metal riveted construction. Heavier than other racers, it is aerodynamically cleaner and faster. "T" tail smaller with less drag.









There's more learning and flying with this larger-sized trainer.



For neighborhood flying use a muffler. Note hand-mounted tank.

# ATOM

A 15-powered advanced trainer for the novice, or basic trainer for the adult beginner.

## HOWARD C. MOTTIN

ATOM (for Advanced Training Operational Model) is a multi-purpose trainer. It is intended to teach the basic skills of control-line flying, and to serve a variety of other purposes. These could include: basic flight trainer, advanced trainer, sport model, basic stunt trainer, sport racer, slow combat trainer.

Any desired modifications can be made after the novice gains basic flying experience. This model was designed large enough in size to lend itself to conversion to advanced flying possibilities. First, build as described. Then, as flying experience is gained, try different modifications to the basic model and see what results can be achieved. As starters try a larger engine, more control movement, different CG locations. Learn by experience how different set ups will affect the flight. This model will serve as an excellent base for learning the fundamental laws of aerodynamics

are applied to all control-line aircraft.

Any type of training aircraft must have three essential requirements: simplicity, durability, and flyability. Lack of any one of these essentials and the initial flying experiences of the novice end in frustration. The aircraft must be simple to construct and maintain. This requires a minimum of parts and work. Once assembled, the plane must be durable enough to withstand the mistakes of the novice pilot. It cannot end up in a pile of sticks at the slightest bump, but it is impossible to design a model to withstand a power dive straight into the macadam. Therefore, it must be stable enough for the novice to control and fly with. A plane that assembles in two pieces from "cast iron" and flies like it, is of little value. A primary flight trainer must teach the essential flying skills.

The ATOM has these essential qualities: It can be assembled in a matter of hours with a minimum expenditure for materials. Three sheets of balsa, a piece of plywood,

hardwood motor mounts, and some wire are all the construction materials required. It has enough "beef" built in to withstand the rigors of many training flights. And because of the solid wood construction employed, it can later be altered to suit the wishes of the builder.

Finally, of primary importance is the fact that the ATOM is flyable. The functional design will not win any beauty contests. It has all the essential components of a control-line model aircraft in places that are easily accessible. For example, the novice can change fuel tanks, control movement with ease.

There are two good basic ways to start flying. The first is to build a small 1/2A size and the second is to build a larger size model. There are advantages to both methods and the novice can decide for himself which way to choose. The advantages of the 1/2 trainer were presented in the "Small Fry" article (May '69 issue). The main difference between a 1/2A-size model and a larger is price. The 1/2A model can be built for



Control horn is from R/C source. It just bolts onto elevator.



the price of just the engine on larger models. The chief advantage of the large size models lies in flying performance. Building and flying 15-size and larger models gets the novice out of the toy category and into the sport events.

The ATOM was designed around the 15- to 19-size engines. Any of these engines will serve as an ideal powerplant. I choose an Enya 15 to power the prototype model primarily because it was available at just about all hobby shops in the area. The 15-powered model can be flown nicely on 52½-ft. lines. A 19-powered version could be flown on 60-ft. lines with the same performance. With these small engines, the plane is docile to fly and should present no unforeseen problems. Because of its large size, the plane will handle larger engines, with a corresponding increase in performance and flying difficulty. The recommended combination is a 15-engine, 9-in.-diameter, 4-in.-pitch propeller, and 52½-ft., .012"-diameter ready-made lines.

**Construction:** Lay out the parts on the wood sheets as shown on the plans. Use a ball-point pen or fiber-tip pen for this purpose. Then cut out all the pieces, using a sharp X-acto knife. It is easier to cut the plywood and thicker balsa with a jig-saw

some positive dihedral to the wing.

Mark a line 1½" back from the leading edge all along the top of the board. Then lay the board on a flat surface and slide one of the ½" trailing edge pieces up to the rear of the board. With your pen, mark a line along the rear edge of the board at this ½" height. Using a razor-plane, shape the board to the airfoil section, holding the top line as the high point and the line the rear for gluing on the trailing edges. Check as the airfoil takes shape with the template made from the plans. The airfoil is constant for the full 34" span. When carving is complete use a sanding block to remove rough spots and to round the leading edge. Following the shaping operation, pin the airfoiled piece down flat on your workboard over a sheet of wax paper, then butt glue to it the trailing edge pieces. Let set overnight to assure a good bond.

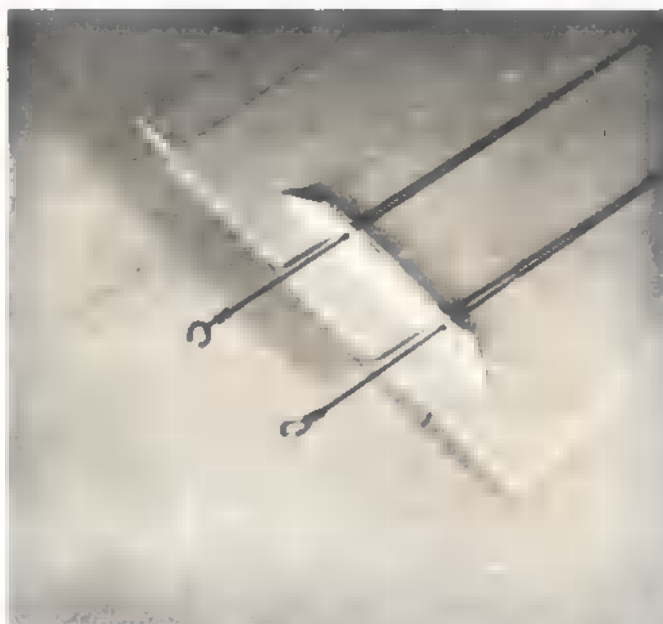
Remove the wing from the building board, determine the exact center, and draw a centerline. It should be close to 16½" from the end, but this is not critical. Draw the centerline on the top and bottom surface using a square for accuracy. Determine which is the right and left wing panel using the plan as an aid. Turn the wing over and mark the location of the ply-

wood sandwich. First, spread a thin coat of glue over the surfaces to be joined and let this soak into the wood pores for a few minutes. Follow this with a second liberal application of evenly spread glue. Join the plywood doublers and balsa fuselage together and slip the hardwood pieces into the slots between the plywood. Press the assembly flat on a table and hold it in alignment with your hands for a few minutes to allow the glue to begin to set, then clamp the assembly firmly in a vise, or with C-clamps, until the glue has thoroughly hardened. Let it set at least overnight. Glue on the canopy and plywood tail skid mount. Complete the stab assembly while waiting for the fuselage.

After the fuselage has set, remove all clamps. Wrap a piece of coarse sandpaper around a small block of wood. Use this to sand the round nose of the fuselage and to round off any corners. Follow this with a finish-sanding of the fuselage with fine sandpaper (320 or 400). Lay the fuselage flat and mark the locations for the engine mounting holes and landing gear holes. Use a ⅜" drill except the landing gear anchor holes, which are ⅜"-diameter. Drill the holes for the tail skid and the fuel-tank retainers with a ⅜" diameter drill. It is



Midwest gear clips hold landing gear. Pushrod is under bellcrank.



Bring leadouts through guide before bending hook-up loops.

or razor-saw, if you have one. As each piece is cut out, lay it on the full-size plan and check for accurate size. If it is a little off (⅛" to ¼"), don't worry about it. About the only important cutouts are the notches for the engine mounts and the wing slot. These should be made as carefully as possible to avoid problems in proper assembly. The flat portion of the airfoil should be cut along the centerline of the fuselage. The upper curved surface can be cut as shown on the wing template.

Each of the three major parts of the plane should be built separately for best results. The wing is made from the ½" sheet, the ½" trapezoidal pieces, and the two plywood supports. Start by carving the airfoil section in the ½"-thick, 34"-long balsa board. First, sight lengthwise along the board to determine which way it is warped. If you've been lucky enough to select a flat one, you're all set, and it doesn't matter which side is the top. If the board is warped, select the top as the surface that is curved upward. This will in effect give

wood bellcrank platform, and lead-out guide the bottom left panel. Cut a slot ¼" wide and ⅜" deep for the guide. Likewise, gouge out a recess for the bellcrank platform ¼" deep in the wing. In the bottom of the right wing tip, cut a recess for a small weight. A flat fishing sinker will work perfectly. Glue in the platform, guide, and weight to complete the wing assembly.

The fuselage consists of six pieces. You have already cut out all these in step one; if not, do so now. The plywood pieces can be cut with a knife, but a jig-saw is better. The rounded section be cut a little oversize. Don't worry about how smooth the curve is at this stage, it will be blended to a smooth round shape in the final sanding. The ⅜"-sq. motor mounts are made from hardwood. Maple is the best material, but spruce can be substituted. The purpose of these pieces is to prevent compression of the wood when the engine is bolted down tight.

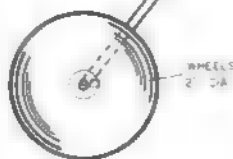
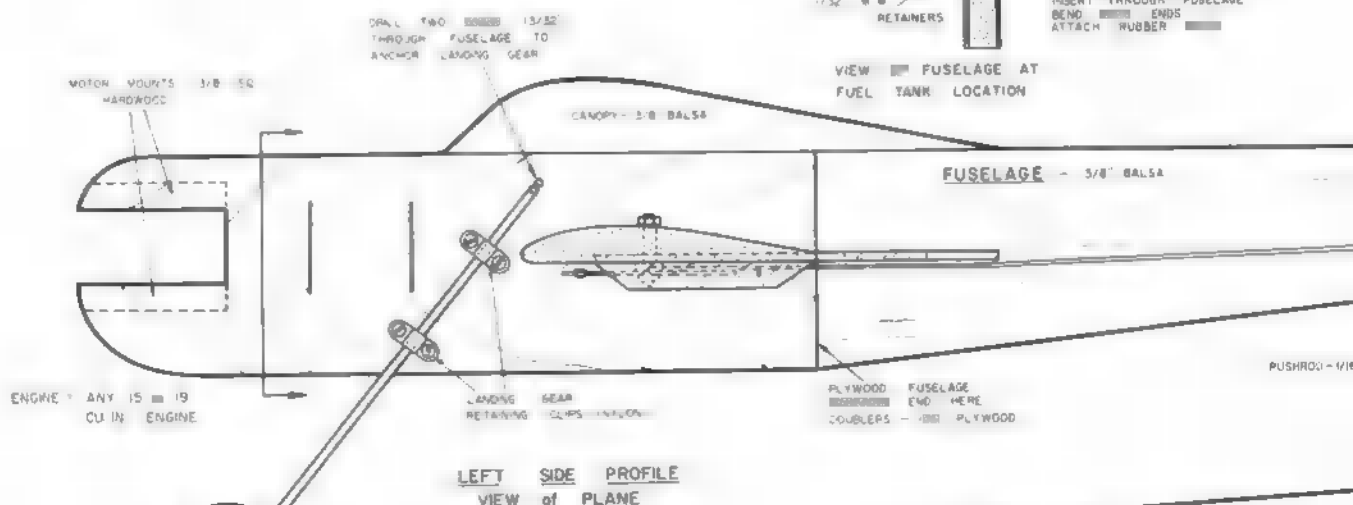
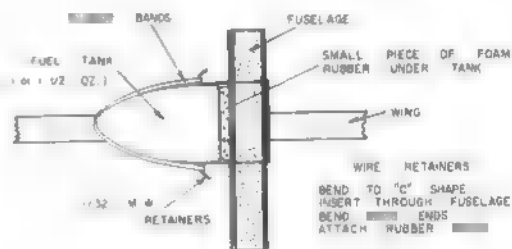
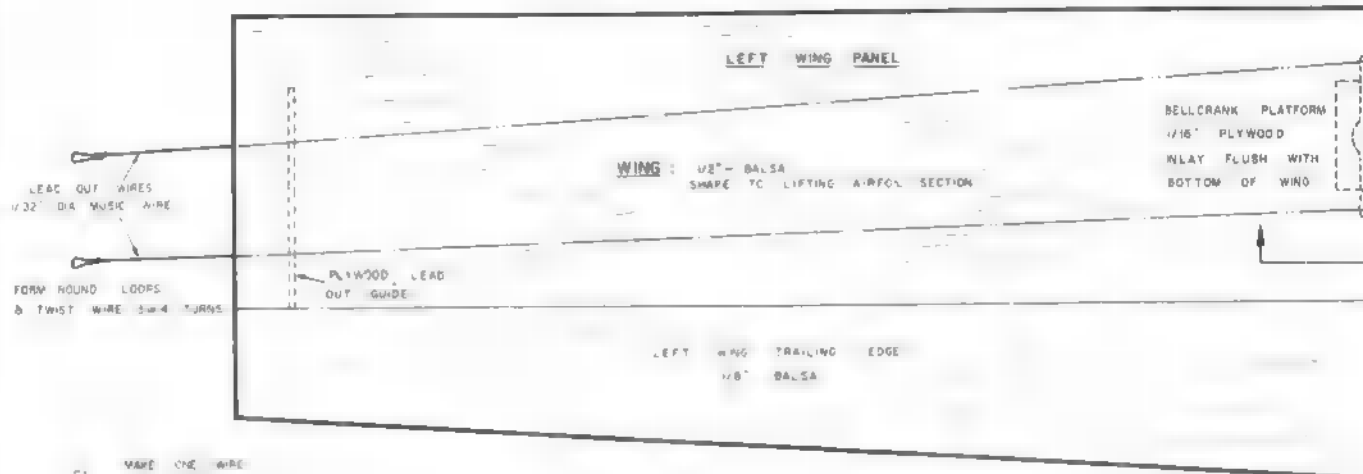
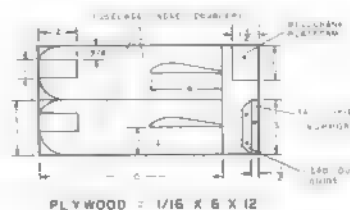
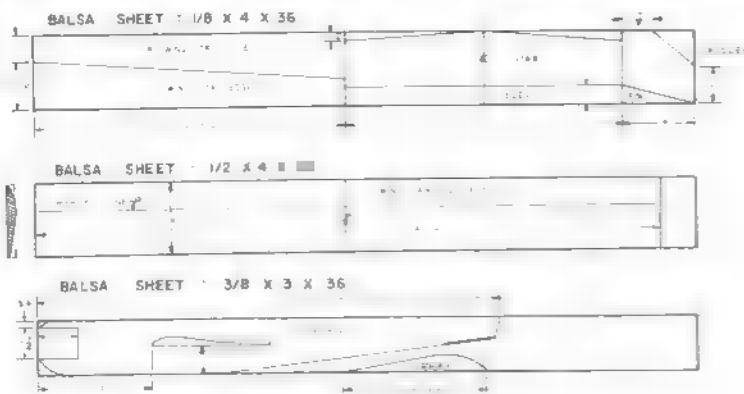
The nose section is assembled at one time

far easier to drill these holes now than later, when the wing is attached. Glue on the tail skid.

The tail assembly is conventional. Sand all the edges round with fine sandpaper, then pin the stab and elevator on the building board over a piece of wax paper, leaving a ½" gap between them. Small cloth hinges are glued alternately between the stab and elevator. Start at the ends and work toward the center. Leave about half the hinge cloth extending past the wood. After the glue has dried, turn the pieces over and mark a small "x" where the cloth will be glued on the opposite piece. Then slide the stab and elevator tightly together and pin down to the board. Make sure none of the cloth hinges becomes crumpled under the wood. Glue hinges over the x's.

We are ready for final assembly. If you did not draw a centerline on the top of the wing, do so now. Measure a ¼" over on each side of the centerline and draw two parallel lines the top and bottom. Slide the

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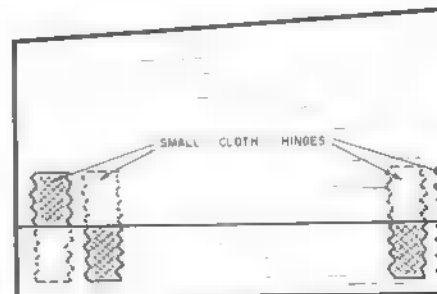


# ATOM

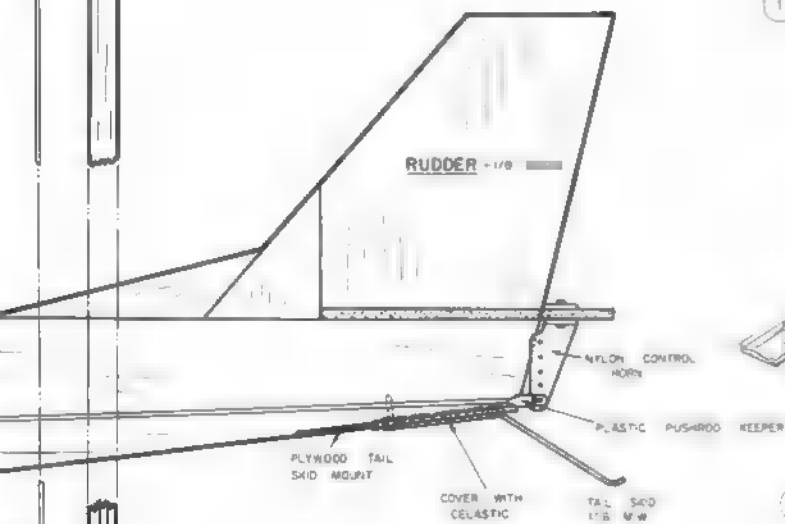
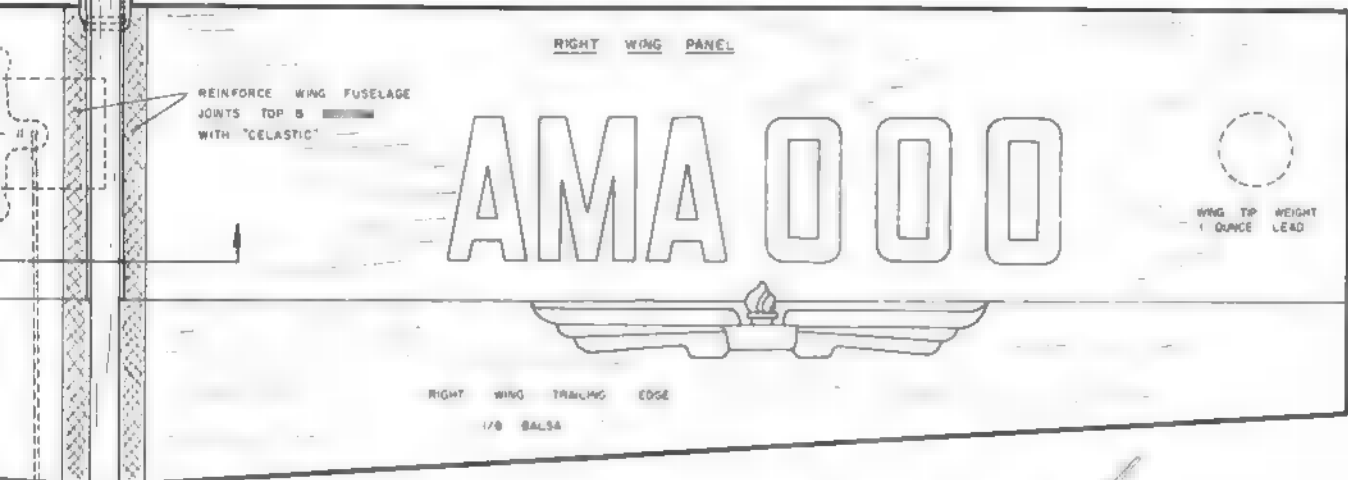
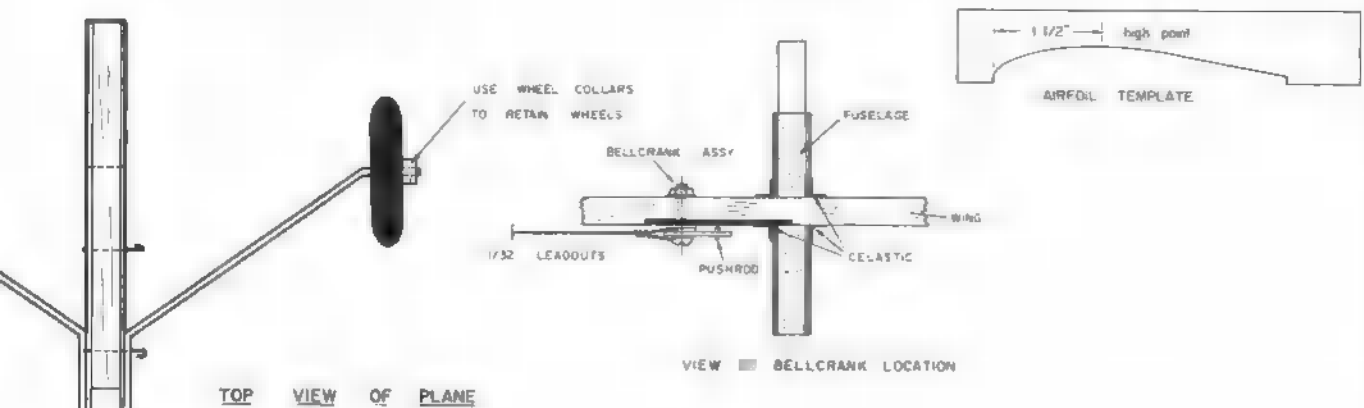
DESIGNED BY HOWARD C. MOTTIN



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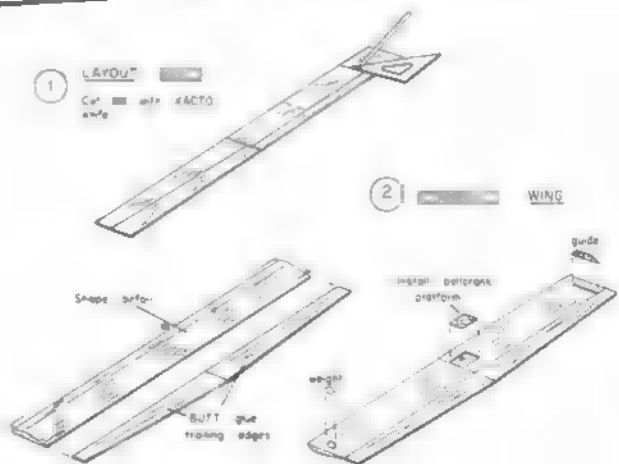




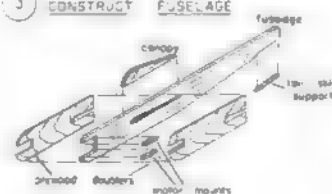


1 LAYOUT

Cut to size



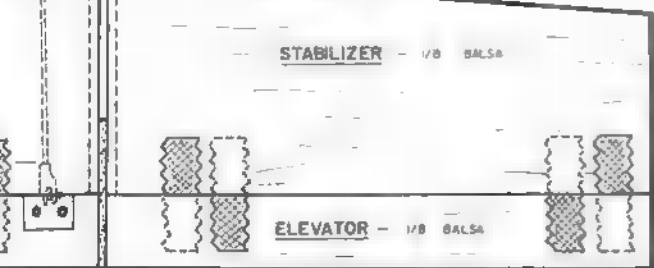
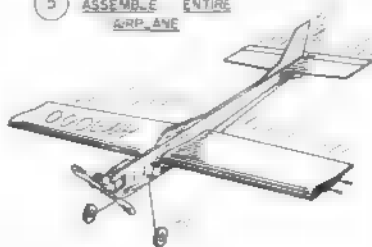
3 CONSTRUCT FUSELAGE



4 ASSEMBLE TAIL



5 ASSEMBLE ENTIRE AIRPLANE





Lockheed C-5A flutter test model in wind tunnel at Langley. With this kind of model, cameras and strain-gages determine the exact strength or flexibility required of real plane's structure.

Data — lift, drag, and aerodynamic stability are determined with force models. This one has been tested at tunnel speeds of Mach .50. With it, shapes of various parts are changed and studied.

# The Ultimate Models

Precisely built models "fly" wind-tunnel fashion to help solve engineering problems.

**GEORGE PERRYMAN** Senior Aircraft Design Engineer Lockheed Aircraft Corp.

WHENEVER you see a jetliner or supersonic fighter whistle over, you can be sure it has been tested in a model many thousands of hours, long before the first actual flight as a new plane. These flights are made in wind tunnels by fantastically accurate models. Very little wind-tunnel testing was done before the First World War, since it was cheaper to build a full-scale plane and hire a brave test pilot. Planes then were slow compared with today that almost anything with wings and tail could be made to fly, and efficiency wasn't at a premium as it is now.

Some wind-tunnel models are built to contoured accuracy within .001 inch from solid stainless steel. The materials used today have kept pace with the ever increasing requirements of strength, accuracy, and new methods of fabrication. For example, 8-foot model of a large military transport, such as the Lockheed C-5A Galaxy, which has flaps, elevators, rudders, ailerons, and leading-edge flaps, may cost \$300,000 to design and build. This may sound like a tremendous sum, but remember this model is approximately only  $\frac{1}{25}$  of the full-scale airplane. Any inaccuracy of  $\frac{1}{100}$  of an inch means one-quarter inch on the real plane. The final contouring must be hand-worked by skilled craftsmen, and it is a very tedious process working to microscopic tolerances.

Since the range of wind tunnel testing is

large, zero mph to over 20,000 mph, we will deal here only with subsonic models tested up to Mach 0.95 (722 mph at sea level). There are several basic types of subsonic models tested. To mention only a few:

**Force model:** Force models, which may be mounted with a sting running from the aft end of the fuselage to the tunnel support. These models usually have a six-component balance mounted in the fuselage which will give data for lift, drag, side force, pitching moment, yawing moment, and rolling moment. These forces and moments are electronically registered and recorded to determine aerodynamic efficiency, and to prove out stability and control. For example, many different wings, fuselages, fillets, and tail shapes are tested many months before final airplane configuration is decided. Models are the economical way to do this. Can you imagine trying a dozen different full-scale wings (223 ft. span) on the real plane? We would have to wait many years to get the optimum wing, fuselage, and tail combination, to mention only the basic items.

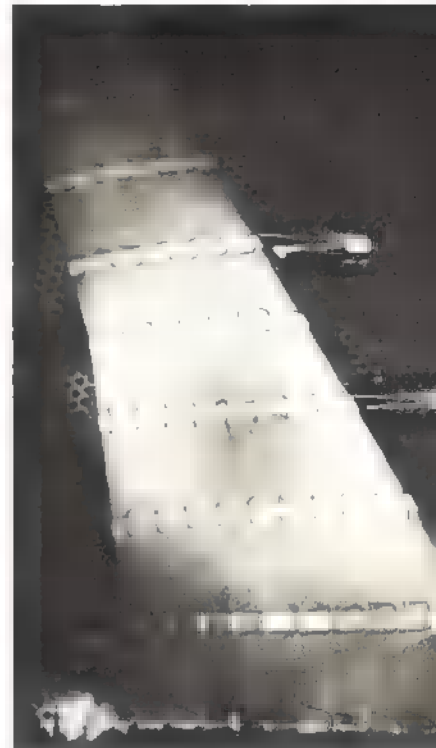
To make a plane fly fast and also land and take off relatively slowly is the major job of gray-haired engineers. High-speed models are necessary to obtain data for cruise condition, which accounts for 95% of cargo airplanes' flying time. After testing many wings, fuselages, tails, and power-plant combinations, and arriving at what

we hope is optimum, effort is exerted on smaller items in an effort to further reduce drag. Appreciable drag reduction can be realized by smoothing airflow around the wing-and-fuselage junction and in wheel-fairing. Just the "right" fillet or fairing is arrived at by testing 15 or more. Many pylon-nacelle combinations also are tested and evaluated on the basis of drag, weight, and efficiency of engine inlet.

On an airplane such as the large C-5A, airplane drag reduction is of paramount importance. By lowering drag just one-third of 1% there is a cost savings of approximately \$200,000 over a ten-year span for each plane. For this seemingly small drag reduction, the plane can carry 1,000 pounds more payload or fly 55 miles further on each mission. We are dealing with a plane which is the largest to enter production to date, with a gross weight of 728,000 pounds, 223 feet in wing span, 246 feet long, 65 feet high, and with four G.E. TF 39 engines generating 164,000 pounds of total thrust. This plane must be efficient if it is to carry 220,000 pounds of cargo 3,500 miles, up to 260,000 pounds for a shorter mission.

Military requirements dictate that the takeoff and landing distance must be less than commercial jets flying today. There is the additional requirement of operating from unpaved runways throughout the world. Lockheed has had to go all out for this one and utilizes 24 main wheels and





Because air as a fluid can behave unpredictably when flowing around solid objects, various types of flow visualization tests are made. Here, light oil on surface shows air-flow patterns.

A more familiar type of visualization is with yarn tufts. Here, a wing at high angles of attack shows simultaneously flow separation, reversal, and smooth laminar flow. Note flow in upper left.

four nose wheels to decrease imprint pressure, which is pounds per-square-foot ground contact loading on each tire. Engine reverse thrust, in addition to wing T.E. flaps, L.E. slats, and upper-surface wing spoilers, are utilized to add drag and/or reduce lift, so the wheel brakes can stop over 300 tons of plane in a short distance. Hundreds of tests are necessary to prove aerodynamic, structural, and mechanical integrity long before the big bird flies.

On wind-tunnel force models' ailerons, flaps, rudders, elevators, cargo doors, pylon-nacelles, etc. are strain-gaged to give data for determining strength required, and also how much force is required for actuating mechanism to operate them.

Simultaneous development of low-speed models is necessary to the landing and takeoff regime. The problem here lies in developing high-lift devices, such as leading and trailing edge flaps, which will increase

lift so that the plane won't be a "ground-hog." This is a never-ending task, since weight, design time, manufacturing cost, and maintenance costs can skyrocket if an overly complex system is chosen. Single-slotted flaps, double-slotted, Fowler flaps, and even more with more yet are tested. The final flap selection requires many months of almost continuous testing and evaluation. There is great challenge in developing high-lift devices which enable the low and slow portion of the flight requirement to be realized.

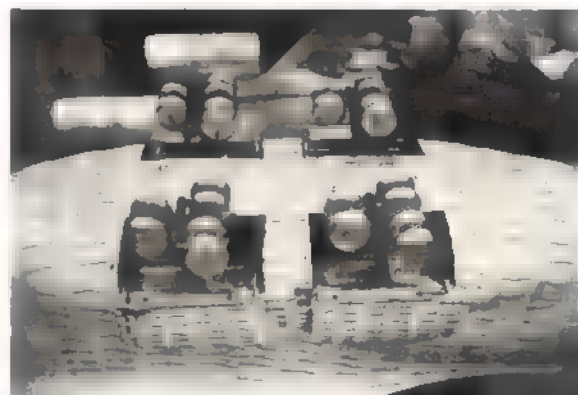
On the first flight of the C-5A Galaxy, the takeoff speed was within two knots of calculated speed, determined many months prior to results of much careful wind-tunnel testing.

Over a dozen complete models with many extra components are necessary to develop the C-5A. Most of these are designed for a safety factor of five times the expected

load. This is necessary because, if any model part should fail, severe damage can result to a \$30,000,000 wind tunnel. All screws must be the self-locking type. For example, the wing alone on an 8-foot-span C-5A model will lift over 10,000 pounds. This means that the wing-to-fuselage bolts must be able to carry over 50,000 pounds. To house electric motors, pressure tubes, switches, valves, etc., can be rather exasperating, since the inside of the fuselage may be packed in every cubic inch of space. Components have to be designed to be quickly removable, since wind-tunnel test time can run thousands of dollars per hour. It is easy to design a hard model to work on, but sometimes difficult to design for simplicity in making necessary replacements.

**Pressure models:** Pressure models externally look almost like force models. Instead

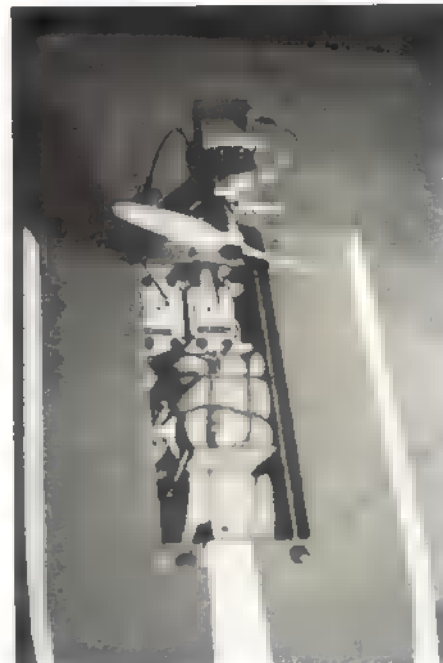
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Considering that the C-5A has total of 28 wheels, engineers are interested in their aerodynamic influence — such as drag, turbulence, and pitching effects. Model on right has retractable gears to show turbulence caused before, during, and after retraction. Tufts at normal position.



Skimmer is exciting and useful. You can take it along on vacation or put it to work to retrieve stalled power boats or seaplanes and becalmed sailboats. Note whip antenna.



Sequential single-channel set guides it. To operate at peaceful resorts use a muffler.

# The Skimmer

For fun at the lake, how about a 15-powered R/C airboat? Only rudder and engine control are needed.

PAUL W. HOOK

THE Skimmer is evolved from the old RA Airboat kit, but is slightly larger in length and in beam, but lower in profile. It is necessary that an airboat be low in profile and have sufficient beam because engine torque and centrifugal force in turning can flip an airboat. These boats literally skim the surface of the water. Thus, the name, The Skimmer.

**Construction:** The entire hull is constructed of  $\frac{1}{8}$ " balsa. The two outer sides and bottom are hard balsa. For obvious reasons, the rest of the balsa is medium-grade except for the top fore deck, which is soft balsa because of the slight compound curve.

I decided to use the egg-crate method in building the hull framework, and to a degree, this type is self-aligning. You will note the 15 watertight compartments. The hull is unsinkable.

Construction begins by slipping bulkheads #3 and 6 into slots of the inner sides. Then cement and pin over plans to keep in alignment. Add the transom and bulkheads #4 and 5. The outer sides are cemented to bulkheads #3, 4, 5, 6, and transom.

At this point, I advise the use of waterproof cement, such as Ambroid. Do not use white glue or Titebond. They are not waterproof. The  $\frac{3}{8}$  x  $\frac{1}{2}$  x  $3\frac{1}{4}$ " hardboard pylon mounts are drilled per plan. 4-40 blind nuts installed, and then glued in notches in bulkheads #5 and 6. Note, these pieces extend  $\frac{1}{8}$ " above hull framework. This is to keep the top even with the top sheet.

While this is drying, glue up top and bottom sheeting. I used two pieces of soft  $\frac{1}{8}$  x 4 x 11". This completes the foredeck sheet from nose block to dash. For the bottom

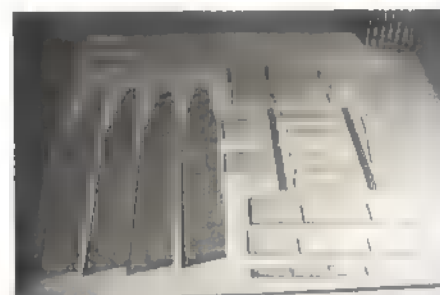
sheet, use three pieces of  $\frac{1}{8}$  x 6 x 11" plus one piece of  $\frac{1}{8}$  x 2 x 11". Use the masking-tape method of joining the top and bottom sheet, as this keeps the joints square. Next, add bulkheads #1 and 2 to hull and draw outer sides in and cement these bulkheads. Add  $\frac{1}{4}$ " thick gussets at junction of outer sides and bulkhead #1. When dry, add bottom sheeting and top foredeck sheet. For the top rear sheet, use  $\frac{1}{8}$  x 4" sheet with the grain running fore and aft. Notch out for pylon hardwood mount pieces, cut small strip of  $\frac{1}{8}$ " to cap top of bulkheads #6 and transom. Cut a piece of balsa  $\frac{1}{2}$  x  $\frac{1}{2}$  x  $1\frac{1}{4}$ " and cement in position for rudder post. Drill for a piece of  $\frac{3}{32}$ " I.D. (inside diameter). Cut a brass tube  $1\frac{1}{2}$ " long, and epoxy in hole. When hull sheet is drying, construct hatch and plank with  $\frac{1}{4}$ " balsa, grain running fore and aft. Allow to dry overnight.

Cut aluminum pylon from  $\frac{1}{16}$ " stock. (I used a Mirro loaf cake pan.) Bend according to plan and drill for 4-40 screws, using  $\frac{7}{16}$ " drill. Drill suit engine used.

Add 1 x 1 x 9" balsa nose block. Allow to dry. Then sand the entire hull. Cover with silk or silkspan. Cement keels in place directly under inner side pieces. Apply eight coats of butyrate clear dope and wet sand. Paint any color you desire.

Bend a piece of  $\frac{3}{32}$ " music wire as per plan. Solder  $\frac{1}{2}$ " length of  $\frac{3}{32}$ " I.D. brass to top and flatten the end. Then drill  $\frac{1}{16}$ " holes for Kwik Link.

Drill a  $\frac{1}{8}$ " hole in rear hatch bulkhead and in #6 bulkhead. Cut  $\frac{1}{2}$ " length of  $\frac{1}{8}$ " dowel and cement in hole in #6 bulkhead. Cement a piece of hardwood to center of front hatch cleet. Drill a  $\frac{3}{32}$ " hole and install a 4-40 blind nut. Drill  $\frac{7}{16}$ " hole in hatch sheet to match the above block. Use a  $1\frac{1}{4}$ " 4-40 R.H. screw with washer



Basic parts: sides, bulkheads and transom. Top and bottom sheeting cut to fit later.

under head to hold front of hatch in place.

The original Skimmer used Royal rudder and engine-control servos, O.S. Max 10 R/C engine Controlaire SH-100 receiver, mule transmitter, and a Perfect 2-oz. profile control-line tank.

The throttle linkage is via nylon tube and cable which is cemented into the hole in bulkhead #6 and transom, and clamped to aluminum pylon with a Top Flite landing gear clamp.

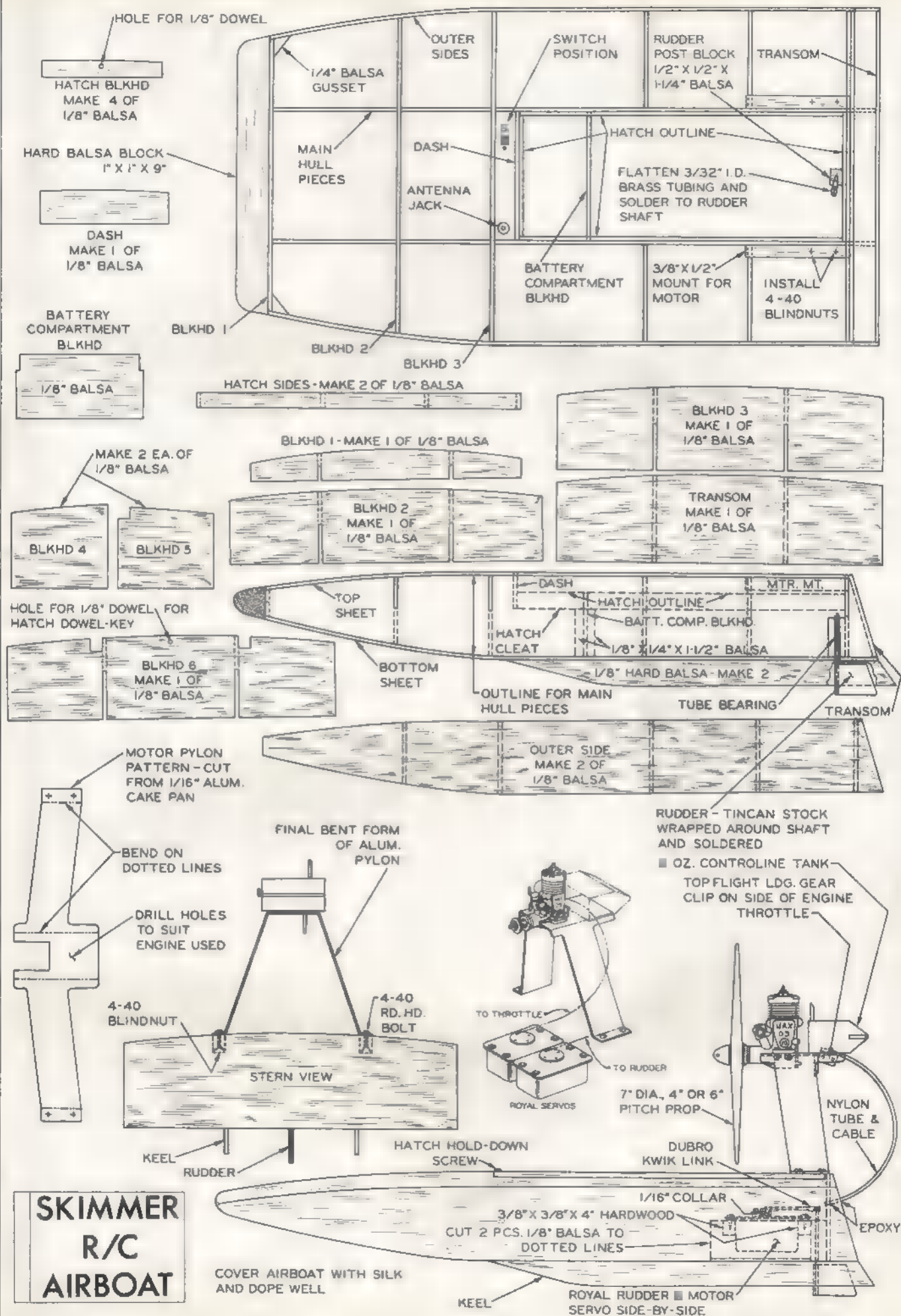
The rudder is cut as per plan and soldered to  $\frac{3}{32}$ " rudder post.

And now, a few tips on the operation of The Skimmer. If the boat isn't balanced properly, it will porpoise (front end will slap up and down) when running. To alleviate this, move the battery pack forward, if necessary, add weight. The original model worked A-Okay with the equipment mentioned. The hull should set level at rest in the water. Do not attempt to run The Skimmer without keels. They give it directional stability.

The Skimmer has proven to be very easy to construct, economical, and it is very dependable with the equipment suggested in this article.

Picture, if you will, several Skimmers running at once, using superhets. What a thrill to behold! So let's have at it and be prepared for spring. I intend to install my Logitrol proportional for a try next spring. See you at the local pond.







The sunburst paint scheme is one of the most fascinating, difficult, and visible. However, with clear plastic covering it becomes one of the easiest to lay out and paint.

## NEW CONSTRUCTION TECHNIQUE FOR R/C

# Cellulose Wings

Clear acetate foam-wing covering offers unusual inside painting technique, high gloss, and great strength.

**GERALD HAYHURST**

YOU will need about 42 x 40 x .010 in. cellulose-acetate sheet either all-clear or frosted on one side. It may be obtained from most office and art supply dealers (used for covering maps, etc.). Cost is about 50¢ a foot or less if purchased in quantity. You will need foam wing cores. To spar the cores, I let in a spruce  $\frac{1}{8}$  x  $\frac{1}{4}$  top and bottom spar. Since the acetate is stronger than paper, we do not need as much spar. At the center I use a  $\frac{1}{8}$  plywood brace about 8" long, and pine blocks carved to shape, for the hold-down bolt at the rear, and dowel pins at the leading edge. Sand cores smooth and set aside.

Put a sheet of cellulose acetate on a table covered with a blanket to prevent scratching. Lay the wing core straight on the acetate with about  $\frac{1}{2}$ " sticking out past the

root, marking a line with a grease pencil (all grease pencil lines are made on the outside of the cover) along the trailing edge and about  $\frac{1}{2}$ " out from the tip. Roll the core up so that it is setting on the leading edge; make a mark in the  $\frac{1}{2}$ " border at the center of the leading edge. Roll the core over and again make a line along the trailing edge. Make sure the core did not slip. Cut along the lines you made, then make one for the other half.

Lay one of the acetate panels on the table (grease-penciled side up) and make a grease-pencil line starting in about 3" from the root and about  $\frac{1}{2}$ " back from the center marks you put on earlier. This is the front edge of the fan pattern. Make the rest of the pattern to suit, or any other pattern that you like. I selected this one because it is most visible.

Lay the marked pattern face down on the bench. Put the other half on top, face up.

You will trace the pattern from the first panel; trace on the second panel. Sand the panel on the bench (make sure you are sanding the opposite side from the grease-pencil marks) with most any fine sandpaper. Make sure you sand all the way to the edge. Pick up the panel and look at it in front of a light to see if it is sanded all over. Frosted material needs no sanding.

Lay panels, sanded side up, on the bench and mask the pattern so that the darker stripes are exposed. Make sure all the rest is covered, because any over-spray will show later. Spray one heavy coat of dark color, or two light ones. Let dry and remove masking. Spray on an all-over coat of light color; yellow is very good. You may need two coats to keep the spars and trailing edge from showing through.

Coat foam cores and both panels with any of the contact bond cements. Let dry. Start applying by carefully laying the trailing edge of the core on the edge of the panel so that the pattern is on the top of the wing. Roll the core over on the panel and rub out all the wrinkles. Trim excess, join the two panels together, and add wing tips. I use a piece of  $\frac{1}{8}$  plywood to make a square vortex-type wing tip. It drags the ground first in a one-wing-low landing.

Run a heavy coat of clear dope along the trailing edge and dope the wing tips with color to match. A  $\frac{1}{2}$ " strip of Monokote will seal the center joint, or use a bead of silicone rubber glue.

Put a small amount of dope thinner on a rag and clean the wing, to remove the grease-pencil marks and any over-spray that might have come around from the inside. Paint and add ailerons in the usual

way, and you have a wing with a deep-looking paint job, and a shine you have never seen before.

Don't think this process is too much work, because once you have tried it, you will find it as fast as painting an ordinary outside-painted wing. And the results are highly gratifying.

You could use colored  $\frac{1}{8}$  or  $\frac{1}{2}$ " cellulose tape on the inside as a feature strip between the colored dope. Put it on before you sand, then lightly sand over it. Now go on with the masking, using the tape as the line. If you have a stencil of your AMA number you might spray it on with silver or gold before the color goes on.

You won't notice any difference in the flying, but the wing cleans like glass. It won't soak up fuel, paint won't chip off, and if the other modelers don't ask how you got such a nice paint job, something is wrong.





Roll up completed and sparred core on leading edge and mark center of plastic.



Roll from leading edge to trailing edge and mark covering allowing 1/2-in. extra width.



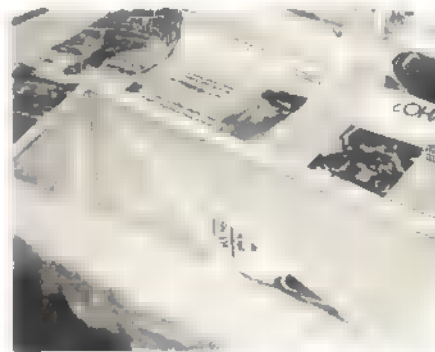
Repeat the process for the other wing surface. Also allow 1/2-in. extra margin at tips.



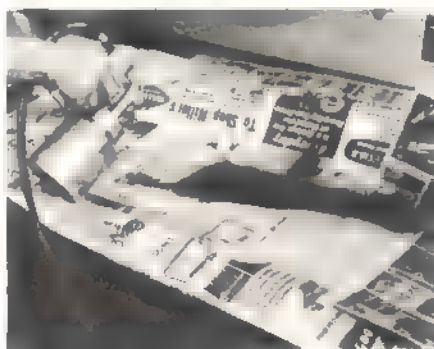
Using grease pencil draw the desired painting pattern on the outside of plastic.



Turn the material over and sand entire inside surface to prepare it for painting.



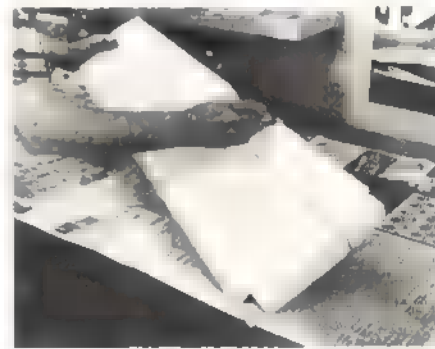
If spraying, completely mask the area to be second color with tape and newspaper.



Spray dark color first. If metallic color, put color 1st, then undercoating.



Remove the masking and spray the entire sheet. This 1 has solid-color wing bottom.



Thoroughly coat cores and painted side of panels with water-based contact cement.



Touch core and covering material first 1 trailing edge. Perfect alignment necessary.



Slowly roll the core up to the leading edge, keeping covering taut. Roll to other side.



Trim edges, clean, add tips and hinge the ailerons. How about that instant gloss!



At M.A.T.S. show fabulous variety of beautiful R/C models was seen. This hobby offers something for everyone. Shown are sailplanes, racers, scale WW1, WW2, a modern jet, a modern private plane, a sporty scale biplane, experimental metal designs, and a fascinating black twin-engined delta. This last plane is 10th in a series of delta designs by Phil Girrard. It uses twin tractor engines, fiberglass, balsa and foam. Flies quite fast.

*An editorial "People near model fields can have many different reasons why they don't want planes flown nearby—but NOISE is something they all can agree on!"*

A little over a year ago (Apr. '68 issue, ■ 32) we had an editorial on the ■ of mufflers for model plane engines. Since that time some progress has been made. More clubs have adopted mandatory muffler rules, but still ■ clubs have lost flying fields due to noise complaints. As we pointed out the last time, people near model fields can have many different reasons why they don't want planes flying nearby—but NOISE is

something they all ■ agree ■. And this is nothing new!

Some clubs are reacting to the problem in the only possible way: ■ they want to keep good flying fields, they have to use mufflers. The Ottawa (Canada) RCC was one. Complaints from neighbors (well justified, according to their club paper Editor, Ken MacKenzie) brought opposition to such a sudden head that the club President took it upon himself to impose a mandatory muffler rule within ■ hours. Much grumbling, of course, but with all engines muffled—and the field saved—Ken thinks that, if the group moves farther into the country where mufflers aren't really needed, they would happily continue ■ use them. The simple fact is that the reduction of noise ■ the pit area is just ■ beneficial to the flyers themselves as it ■ to non-modeling neighbors.

The very large DC/RC (Wash. D.C. area) is another case. After much soul-searching, their Executive Council decided to bring up mandatory mufflers (there had been noise complaints, even though their field is far out in the country) at the next meeting, and this fact was publicized in the club paper. We attended this meeting, and were all set for a bitter debate (following experience on the same matter in several New York area clubs). To our amazement the half-dozen or so members who spoke on the subject all seemed to favor mufflers—there wasn't ■ single real dissent! This must be a very level-headed group. At least, modelers' attitudes are changing..



# Technical Notes

**Wearproof needle valve:** Finding that needle valves on some of his big engines soon pound the brass N.V. tube to such an extent that erratic operation is caused by air leakage through the loose threads. Martin Dietrich (9690 SW Beaverton Hwy., Beaverton, Oreg. 97005) always drills the mouth of the tube so that a short length of Teflon tube may be inserted. (Sketch shows how.) A 1/4" depth is plenty. He finds the needle assembly then can be pushed in until its threads engage. The Teflon insert not only seals the needle for leakage, but holds it tight enough so it won't vibrate and enlarge the tube hole. For users of Enya engines, Martin notes that you can obtain left-hand rotation crankshafts, so that regular props may be used with pusher-engine installations.

A couple of errors crept into our condensation of Martin's description of the control stick setup (p. 35, April '69 issue). Parts D and E are inclined on their pot shafts as noted, but turned so there will be more down elevator than up. As Martin points out, deltas have a certain amount of up-trim built in—or they wouldn't fly—and extra down is required therefore to accomplish outside loops. Also, the setup for the new pots must be such that neither control stick will move them more than 50% of its total rotation (that is, of the amount of pot rotation needed to give full range of servo action).

Thus, one stick could move the two pots to 50% of full up, for example. If you turned the stick for full aileron action, one of the two half-up surfaces would move to maximum up (the other back close to neutral).

**Cable control actuation:** Requiring a light and simple system to link the tiny Bentert magnetic actuator to the rudder of a 22" span scale Curtiss Robin, Thomas Sanders (83 E. Shore Blvd., Timberlake, Ohio 44094) ended with setup seen here. A bent paper clip was bound and soldered to the actuator output crank (be sure to use heat-sink—hold with long-nose pliers—on actuator shaft) with small loops at each end. Rudder horn was bent from a strip of thin aluminum, with tips even with hinge line, per A. Cords were tied to horns so that length is identi-

cal. Then the forward cord loops were attached to hooks on the actuator, and the latter positioned to take up cord slack, but not enough to apply tension. Cement actuator in this position. System is lighter than a torque rod, does not rattle, has no inertia and is easy to install.

**Glider tow hook:** Many kit gliders come with no tow hook, which is required for winch or Hi-Start launching. It is often helpful to be able to move the tow hook fore and aft a bit, to adjust to different wind conditions. We show here a hook that Dave Burt (3048 Central St., Evanston, Ill. 60201) worked out for his Kurwi, which has a fiberglass fuselage. Kit for this glider has no hook provisions.

Dave started with sub-assembly seen at top. Saran Wrap sheet was then taped to fuselage bottom in desired location, and two pieces of fiberglass cloth (or Hobby-Foxy Easy-Does-It cloth) placed over the Saran and coated with polyester or epoxy resin. The hook sub-assembly was placed over the cloth, then three or four more cloth squares were draped over the pin assembly and the previous cloth pieces, and the entire assembly well-coated with resin.

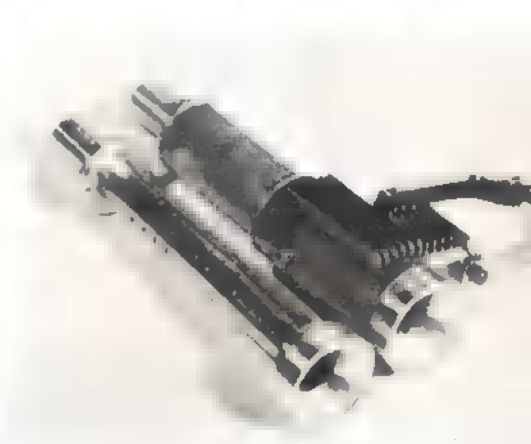
Mold the cloth so it is snug against the pin and wood strip, and all bubbles are pressed out. When dry, trim to the approximate shape indicated, and drill a couple of screw holes. Ply strips are epoxied inside the fuselage to hold the screws. Several pairs of holes at intervals of from 1/4 to 1/2" apart will allow quick field shifting of the hook as needed.

An active glider flyer, Dave had a ball with his glider at the Los Alamitos Nats. and also flew it at a Kansas City field at last summer's Nats. He suggests that R/Cers attending the Philly Nats might like to locate a spot where they could fly during Nats week this year—in a location that won't be an interference to the Willow Grove N.A.S. Some simple competition might even be of interest. Dave is looking into the possibility of a suitable flying site.

**Supertigre muffler conversion:** Among the growing list of R/C clubs requiring use of mufflers we find the B.I.R.D.S. (Long Beach, Calif.) Members using Supertigre engines have found that the back pressure (and engine overheating) caused by the ST muf-



Newest Montana Duster is lighter and smoother. Has symmetrical airfoil with center-hinged ailerons. It's a winner too.



Stock Supertigre muffler can be easily modified to flow-through type. Purpose is to cool the hot exhaust-side of the engine.

More is being learned about mufflers—and more engines are coming out fitted with good ones. The conclusions seem to be that a good muffler doesn't have to weigh half a pound (or even half of that) to do a good job on a 60. A good muffler won't cut the power of the 60 down to that of a 50—or even less. And the right muffler can add considerably to engine power. In this case, we refer to tuned pipes. So far these are rather large, and designed solely to boost engine power. Suppose an engine maker set out to get reasonable exhaust quieting, and perhaps a little boost too. Would this cut size and weight? Who will try it?

The venturi-type mufflers seem the most popular in Germany and Switzerland, where mufflers are mandatory. (See notes later in this column on making one.) However, the new Merco muffler is simple, light and effective, though a little bulky. Just a simple expansion chamber.

Some U.S. R/C clubs have gained priceless info on which mufflers are best. The WRAMS (c/o Art Byers, 72 Daisy Farms Dr., New Rochelle, N.Y. 10804) of Westchester County, N.Y. have perforce used mufflers for some 21 1/2 years. Oddly, they find the main problem is keeping the mufflers on the engines. Mufflers come apart in flight, or drop off entirely. They recommend very careful prop balancing, and use of Clearseal silicone adhesive on every nut, bolt and thread involved in the muffler installation. Every point where this adhesive is to go must be

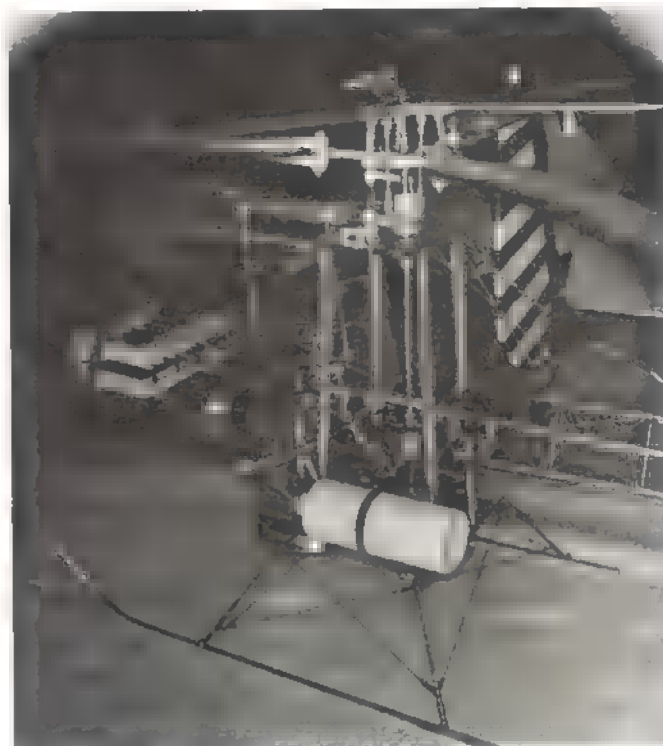
well cleaned beforehand with alcohol. They also suggest that a safety wire on the muffler isn't a bad idea (their field must be littered with the things!). This group also has firm ideas on which mufflers are best (they find most units made by the engine manufacturers work reasonably well). In cases where a "universal" type of muffler kills power and causes serious overheating, the WRAMS have one cure—use the next larger size of muffler, if you can obtain one.

It may be significant that the SMAE lifted the mandatory muffler rules for England from free-flight and U-control, but retained the rules for all R/C flying (did the FF and UC boys just raise a bigger stink?). Also, as we understand it, mufflers will be required at the R/C World Championships events in Germany this summer, both for stunt and scale.

There has been a vast amount of experimentation on the muffler problem by clubs and individual flyers. It would be tremendously helpful to all power modelers (not only R/C plane flyers) if this info could be gathered, sorted and made available to us all. We urge all those with experience to send results to us. We'll be happy to collect, sort, and print them. Somewhere in all the research and testing that has been done we might find a few of the answers we need so badly to help us solve the noise problem. We'd also be happy to hear from engine or muffler manufacturers along the same lines, including such helpful data.



Ray Neugen starts his much-flown Krier Craft. It uses all the power of its O.S. ■ with big prop. Don Lowe did the flying and showed what realism-in-flight is really like. Very graceful too.



A few R.C. copters were shown. This one by Ray Jaworski weighs 5½ lbs., powered by McCoy 35, driving 60" dia. rotors. It is not quite finished yet. Flying it may be harder than the building!

## DISPLAYED AT TOLEDO



As promised. Al Signorino proved to all that Snoopy's dog house would really fly—it did! Requires reliable power as it doesn't glide.



Real craftsmanship seen in boats displayed. Don Hickman showed home-made 4-cyl. in-line engine in his racing three-point hydro.



Amid Sherlock's monster Boeing 747, BOAC VC-10, and Lear Jet, Dave Platt's Douglas divebomber and a semi-scale helicopter.



A show stopper — Ron Jones G17S Stagger-wing Beechcraft with O.S. ■ Everything detailed: interior, structures, landing gear.

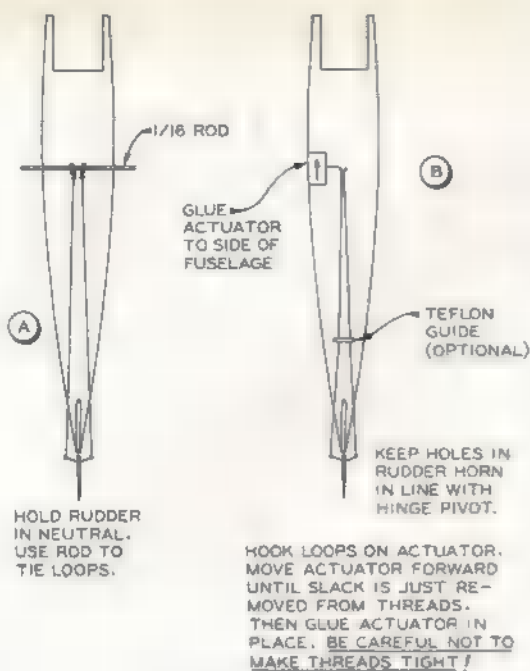


Land racing yacht by Harry Foucher has approx. 1000 miles running. Gets up to 8 times wind speed. All aluminum construction.

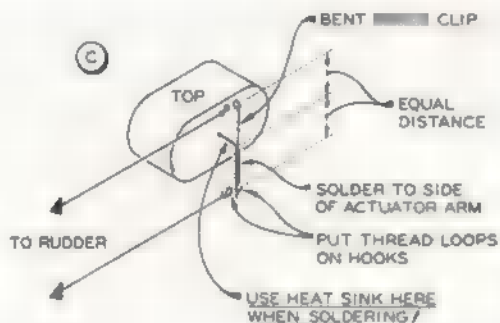


Graceful 12' powered glider is McGovern design. Elevons on flexible wing are best operated by sliding-tubing-type pushrod.





Cable control system seems best with magnetic actuators. Thomas Sanders offers this method of installation. System gives direct operation, no inertia, light weight, and easy installation.



er can be eliminated by changing it to the extractor type (also sometimes called venturi type). If you don't have the facilities for doing the machine work yourself, a kit of parts is available from Bill Willis (4813 Walnut Ave., Long Beach, Calif. 90807).

The kit is intended to convert the ST S 51.1 muffler, but the same conversion may be used on larger ST mufflers by shortening the extension tube, rods, and boring out the adaptor ring. As pix show, a venturi-style nose is made to fit the ST body and the full-length extractor tube has enough small holes drilled in to equal the area of the large tube. This gives almost 300% greater area for exhaust gases to exit than in the stock muffler. Back-pressure is relieved with no noticeable increase in engine noise. The airflow through the extractor tube helps pull the gases out and aids cooling. Engines with the converted mufflers have almost as much power as without, and they last a lot longer.

**Slightly smaller Kwik Fli III:** Or is it a larger Flea Fli? Bob Aberle (33 Falcon Dr., Hauppauge, N. Y. 11787) has an 80% scale Kwik-Fli III ready to go. Will be powered initially with an Enya .19 and Heathkit full house propo, and weighs 4 lb. This is somewhat larger than Phil Kraft's 275 sq. in. screamer, which Bob (and quite a few other Sunday flyers) consider a little too hot to handle. Also a little larger than the new Midwest "Flea-Fli +10" which has 336 sq. in. area, it will be an easier fit for Bob's

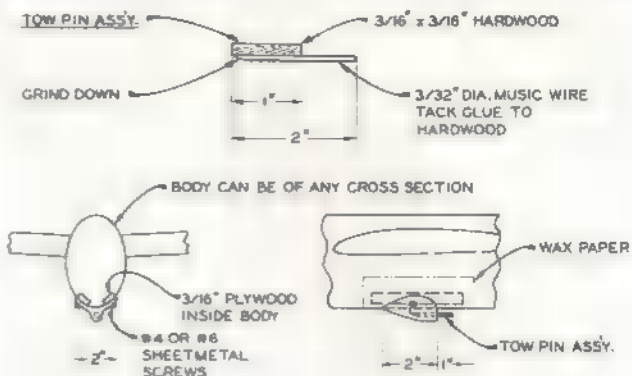
1968 Heathkit receiver. Bob expects he'll want more power eventually, and the plane is made to accommodate an Enya .35. He wonders if anyone has worked out a 6-meter band conversion for the tiny Albin receiver; says he would also like to see a 50-MHz conversion of the Marks Versapulse transmitter and a suitable receiver to go with it.

#### Grassroots

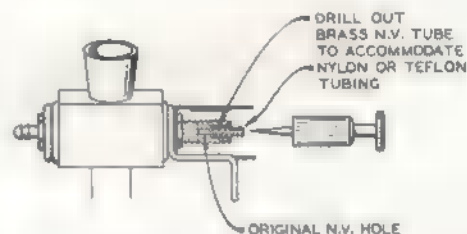
**Fourth Annual Northwest R/C Conference:** Held as usual at the Tye Motel (Olympia, Wash.) this Feb. 22-23 affair showed the growth that all such R/C gatherings seem to enjoy—year after year. George Hickson (11809 18th S.W., Seattle, Wash. 98146) notes 300 R/Cers registered, probably 100 persons total, and 280 for the banquet. Some beautiful new planes were exhibited. There was a big showing of WWI types. Gordon Jensen won first in WWI Scale with his VK Nieuport 17.

The Mt. Ranier R/C Soc. has a WWI meet set for early summer. The Portland R/C flyers had fine action movies of big (9' Piper Tri-Pacer and 10'-span Rearwin Speedster) R/C planes on floats. This club will sponsor a hydro meet at a reservoir in Eastern Oregon, July 4th weekend.

A very good showing of R/C boats was hand. So many, that next year they will have a room for themselves. R/C glider interest is on the rise in the Pacific NW, just as it seems to be the East. R/Cers are branching out in every direction, as



Dave Burt's adjustable tow hook on his fiberglass-fuselaged R/C glider made by forming a sliding fiberglass hook mount. Must also be strong for high-start launches and as skid for landing.



Martin Dietrich found that with much flying the threads or spray-bar bearings wear out. So, he inserted Nylon or Teflon tubing in the spray-bar end. Engine makers could do this in production.

You must have identical-length cables. Hook cables to the arms of the actuator and locate the actuator in plane so that the slack in the cables is taken up. Should never need adjusting.

change from the standard stunt flying! The 4th Conference also had practically continuous R/C movies, talks by famous personages, a fashion show for the ladies.

**Eastern States Jamboree:** R/Cers within reasonable travel distance will have to add the Eastern States R/C Jamboree to their late winter list of "musts." On March 16 some 2400 paid admission—making the first annual holding of this affair a resounding success. Besides a fine show of model planes and boats on exhibit, 31 manufacturers were on hand with their wares.

It was apparent after 10 a.m. opening that the Westchester Radio Modelers Inc. had a tiger by the tail—they will need more space next year. They had to turn away several manufacturers due to lack of table room. Quite a few modelers who had planes with them didn't bring them in, as exhibit table space was limited. So was aisle space. Fortunately, the Westchester County Center (located in White Plains, N. Y., very close to major highways from every direction) has much larger floor areas, which will certainly be needed for 1970.

The WRAMS had set up six judging categories for models, in addition to Best of Show and the Testor Best Finish Award. Judges Bill Northrop (MAN), Howard McEntee (AAM) and Frank Devore (WRAMS) came up with the following top placers (prizes went through third in every cate-

Continued on page 54

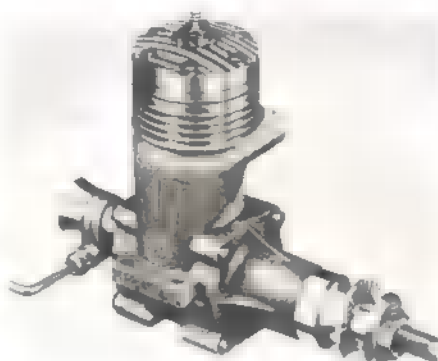
# NEW PRODUCTS CHECK LIST

Write the manufacturers for more data; tell them, "I saw it in American Aircraft Modeler."

**AMT Corp./New 1/12 Plastic Kits.** First of these is the Army's workhorse Huey Helicopter. It's used for troop transportation, rescue and ground attack and support. AMT's UH-1D is equipped with two pilot figures, moveable doors and rotors, grenade launchers, 7.62mm Miniguns and Vulcan 20mm automatic cannon. Authentic 1st Cav. and Canadian decals included. Assemble it as a gun-ship or troop transport. Kit, A-634, is \$1.00.

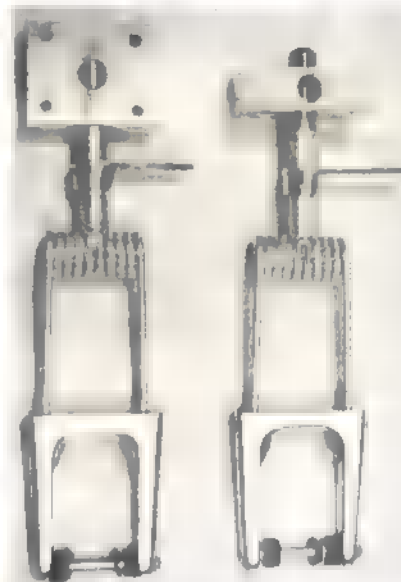
Second release is the B-47E. It's billed as a giant kit (wingspan is 19.3 and length is 18.7 in.). Control surfaces are well-detailed; there are realistic figures, optional position landing gear and bomb bay doors. Two fuel drop-tanks, 24 bombs and authentic decals included with each kit. Price of the A-671 kit is \$6.00. Write: AMT CORP., 1650 10th St., Santa Monica, Calif. 90404.

**Rocket City R/C Specialties/Fuel Tubing.** Look for this new tubing at dealer. Rocket City claims that this fuel line is flexible and will not harden like other plastic types; it will stay flexible in zero degree weather; will not deteriorate like latex tubing; is crystal clear; forceps and pliers will not damage it and it will fit .19's or larger size engines. Query: ROCKET CITY R/C SPECIALTIES, 1901 Polk Drive, N.E., Huntsville, Ala. 35801.



**K & B/New Engines For '69.** Four new Torpedo 40 engines have been developed and are now classified as "Series 69." They are the Torpedo 40 and the Torpedo 40RC. Both are available as "Series 69F" or as "Series 69R." The 'F' designates front rotor; the 'R' indicates rear rotor. All have a new milled by-pass and large throat carburetor for better performance and more power. K & B's exclusive no-tension single ring and aluminum piston is standard. Prices — front rotor types are \$26.95 and \$30.95; rear rotor engines \$28.95 and \$32.95 respectively. Write: K & B MANUFACTURING CO., 12152 Woodruff Ave., Downey, Calif. 90241.

**Williams Brothers/Vickers Machine Gun.** Authentic in every detail is this 2" scale WWI English Machine Gun. It's the latest in the Williams' line of accessories. The Vickers is of durable, molded styrene. In kit form, at \$1.25 each, they are easy to assemble. The 1" and 1½" scale sizes will be available soon. Later in the year, look for scale Lewis, Spandau and Parabellum Machine Guns. Write WILLIAMS BROS., 6719 Salt Lake, Bell, Calif. 90201.



**Tatone Products/Double Strut Steerable Nose Gear.** That's a mouthful to let you know about Tatone's new deluxe landing gear. Four kinds of mounts are offered: shown above are the bulkhead and belly mounts with Nylon pads. They're priced at \$8.95 each. Last two types have the steerable gear pivoting in an aluminum engine mount. One mounts the engine upright — the other is a side mount. These cost \$9.95 each and can be obtained drilled or undrilled. With all four the coiled struts of tempered wire are plated and soldered to a ⅝" dia. steel shaft. Top end of the shaft is threaded and fits into the mount, allowing minor height adjustments. A husky 8-32 set screw locates the steering arm. Cast aluminum wheel brackets hold either slick or round, 2-3" dia. wheels. Bracket set screws allow a ⅜" adjustment of the struts. If you want a friction drag brake effect, merely tighten the axle bolt. Right now the gear/motor mount units come in two sizes: .45 to .59 and .60 to .74. Smaller sizes to be available soon. All hardware is included. TATONE PRODUCTS, 4719 Mission St., San Francisco, Calif. 94112.



**Octura Models/60 Motor Mount.** Latest 60 mount from Octura, shown in foreground of photo, is of a high-strength aluminum alloy. Those mounts in back have been bent and twisted to show the resistance to breakage. Weight is 4½ oz. and it will handle engines down to .29 in. size. Mount is 5"

wide; end plates are 2½ x 1½". These plates are drilled to clear 6-32 screws. Though the engine mount pads are not drilled, four socket-head 6-32 screws are included with the mount. Price is \$3.95 plus 10% for postage. Write: OCTURA MODELS, 8148 Milwaukee Ave., Niles, Ill. 60648.

Continued on page 40



# OUT OF THE PAST-INTO YOUR FUTURE!

## NEW SEMI-SCALE R/C KITS FROM AIRTROL

Fly well with any kind of radio gear from single channel to full proportional equipment. Kits feature vacuum-formed high-impact fuselages . . . molded foam wings and stabilizers. Pre-cut parts. Need no finishing. Cement included in all kits. Less than 3 hours assembly time per kit. Immediate delivery.



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### Airtrol **AB-1** Kit #AB-1

Reproduction of one of the first successful, highly maneuverable combat/scout planes of World War I. 44" wing span. For .10 to .15 engines. Weight 32 ozs. (less engine and equipment)



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### Airtrol **MORANE-SAULNIER** Kit #MS-1

Another World War I pioneer . . . first to shoot through its propeller. 42" wing span. For 10 to 15 engines. Weight 22 ozs. (less engine and equipment)



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### Airtrol **MESSERSCHMITT** Kit #ME-109

A faithful kit of the fast, deadly fighting machine of World War II. 44" wing span. For 10 to 15 engines. Weight 22 ozs. (less engine and equipment)



**\$15<sup>95</sup>**

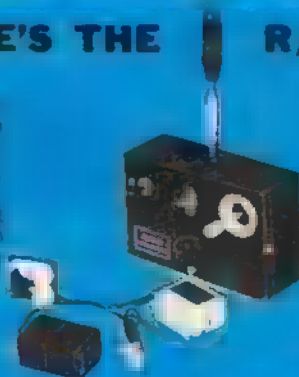
### Airtrol **CESSNA** Kit #150K

Extremely smooth handling . . . easy to assemble and fly. Ideal for the beginner. 44" wing span. For .099 to .15 engines. Weight 24 ozs. (less engine and equipment)

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**\$99<sup>50</sup>**



**AIRTROL R-11** Non-flopping, single channel, pulse control. One function—rudder only. Designed for aircraft up through 19.27 mc freq. Superhet receiver. 56" center loaded antenna. Complete less batteries. Wt. (airborne equiv.) 6 ozs.

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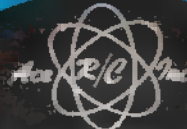
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# ACE R/C

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Looking for new R/C ventures? Join the swing of new mini planes which have appeared in recent model magazines. specialize in the light weight components need for these. You will find listed just a few of the items we have now—more are being added regularly. Join the swing to fun—build 'em small and ball!



## ADAMS AR BABY ACTUATOR

From Adams comes the AR Baby actuator. a lower drain for over-all lighter weight. Designed for 3 volt use with light weight cells. Draws only 50 ma, making 11 cells a choice for tremendous savings in weight. Uses the same frame as the same regular Baby; secret of the weight saving is in current consumption. Weight of the AR is 17 grams.  
No. 14K31—Adams AR Baby Actuator \$8.45  
For the modelers who have the regular Baby and want to convert to lower drain coil, we have it separately. Conversion is simple and takes only a few minutes with hand tools.  
No. 14K32—Adams Coil only \$4.00

## TWO NEW TWIN ACTUATORS

The Baby Actuator by Adams is now available a Twin in either the regular or AR version. The twin magnets provide approximately 2 1/2 to 3 times the torque of the single units and increase weight only slightly. The regular AR Baby weigh approximately 17 grams, while the Twins weigh 22 grams.  
The regular Baby Twin has the most torque and pulls around 110 mah @ 2.4 volts, while the AR version pulls 40 to 50 mah @ 2.4 to 3. The is designed for the Micro and Mini series of planes where weight is important and smaller batteries to keep overall weight low as possible.  
No. 14K58—Adams Baby Twin, regular coil \$10.95  
No. 14K59—Adams Baby Twin, AR coil \$11.45

## ACE

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Whether it's Tuffline fuel tubing, or #2/56 x 1/8" machine screw, or item from almost any major manufacturer, the chances are good that has it in one of the most comprehensive lines Accessories, Components Equipment available anywhere. Our own designer-approved radio kits are added to by lines from E-K, Bonner, Lanier, Midwest, Bee Line, SPL, Coverite, Jensen, Rocket City, Su-Pr-Line, Sterling, MRC-Enya and Webra, etc., etc., etc.

## NEW!



## PROFILE R/C PLANS AVAILABLE

Full size plans for the Mini Profile R/C planes available now for the Fokker D-VIII and Nieuport 17. By Chris Soenksen. Detailed in our Ace R/C Data Supplement 69-2 Picture Story, they scored a hit. Plans offset printed and 17 x 22". Price includes First Class Mailing. More plans will be coming—watch for them. Join in the latest challenge to hit R/C—build a Mini Profile. Average span is 25 inches and area about 120 squares.  
No. 13K31—Fokker D-VIII Profile Plans \$1.00  
No. 13K32—Nieuport 17 Profile Plans \$1.00

## SPECIAL OFFER

Until August 31 we will offer your choice of the above plans FREE with the purchase of a Commander R/O Baby Pulse Package. Offer is limited—and you MUST ask for it.

## MICRO FLEX HOOKUP WIRE

You need a lighter weight wire than ordinary hookup when building the miniature jobs. We have #30 PVC insulated with 7 strands of #31 only .033 diameter. Packaged in a Six color pack each length is three feet long.  
No. 35K3—Six Pack hookup wire #30 \$1.00

## VOGT THROTTLE RESTRICTORS

These must when you want to tame the Cox .010 .020. Simply set to position for the desired RPM and you have a tame power plant that is just the ticket for the new mini scale and semi-scale planes. Be sure to order the correct one for your engine—not interchangeable.  
No. 16K105—Vogt Restrictor for .010 \$2.00  
No. 16K173—Vogt Restrictor for .020 2.00

## COMMANDER PULSE

## DE SUPERHET RECEIVER

This is the first superhet receiver to be produced by Ace R/C and it is a first in many respects: Small—measures only 1 1/4 x 1 1/4 x 1 1/4. Light-weight is about .8 ounce; Relayless—built-in double-ended (DE) with 1 amp transistors in output for hookup direct dual coil actuators. Low voltage—works reliably at maximum range on just 2.4 volts; Versatile—works with most any transmitter of from 400 to 1400 hz; Pulses—exceptionally fast.  
Manufactured by Ace exclusively under license agreements with designers—several circuit breakthroughs found only in this unit.

No. 12K1—Commander DE SH RX Pulse Assembled \$26.50

(Specify frequency: 26.995, 27.045, 27.095, 27.145 or 27.195)





## R/O PULSE MOTOR CONTROL

Now you can add motor control to your Commander R/O Packages. May be used for Testor System. The High Pulse Rate Motor Control by Ken's R/C uses four wires to hook up your pulse installation, and is complete with three position spring wound escapement to give you high, medium and low motor control on a throttle valve engine.

Entire unit weighs 1.1 ounce with leads, completely wired and tested. The high pulse rate required is approximately four to seven times the rate normally put out by your pulse transmitter. For the Commander R/O Package, a simple conversion kit, which consists of an extra capacitor and a pushbutton switch allows the high pulse rate to be added economically and easily. Motor command does NOT affect rudder positions.

No. 16K63C—Ken's Motor Control with escapement. \$19.95

## COMMANDER R/O TX CONVERSION KIT

Conversion kit for the Commander R/O transmitter, as described above, complete with instructions, and all components required.

No. 15K62—HPR (High Pulse Rate) Kit for Commander, \$2.50

NEW! NEW! NEW!

## VERSAPRO

Fred Marks

Components and Parts Packages for all of the Versapro Systems as detailed in American Aircraft Modeler are available. Sent with all new catalogs or separate listing available — send a stamped self-addressed envelope.

**SERVO MECHANICS**—Controlaire S-3 and S-4 and Kraft-Hayes KPS10. For the tinkerer to make his own digital or analog servo. All complete with motor, feedback pot, gears, shafts, output hardware, etc. S-3 and S-4 in easy to assemble kit form; KPS10 preassembled. Mechanicals only, no electronics. No. 14K17—S-3 \$9.98; No. 14K18—S-4 \$8.98; No. 14G55—KPS10 \$13.95

**LAHTI ANALOG SERVO ELECTRONICS**—Complete kit of all electronics needed to make an excellent analog servo with highest resolution from S-3, S-4 or KPS10 mechanics. Use it with the AAM decoder for simple rudder only NON-FLAPPING control. No. 15G31—Lahti Analog electronics only kit, \$11.95

**AAM PULSE AMPLIFIER-FILTER** provides the analog signal required from the Commander DE receiver for use with analog servo. This provides proportional with no flapping of the surface. Much more powerful and uses current only when servo is in motion — smaller batteries may be used. Kit contains PC board, transistors, components for filter. No. 15G24—AAM Analog Pulse Amplifier Filter \$6.95

## MINI GG ACTUATOR PACKAGE

Don Sruhl designed this GG actuator for Rudder and Elevator for .010 to .049 ships, and are proud to present a kit of all components required. Weight is approximately 35 grams and measures  $1\frac{1}{2} \times 1\frac{1}{2} \times 1\frac{1}{2}$ . Current drain is approximately 70 ma on 1.2 volts.

Kit contains low drain five pole motor as used in digital servos, synthane base plate, all hardware, including gears, etc., as well as simplified instructions to allow you to complete in less than 1 hour.

For use with relay receivers, or with the Ace AQSM kit with almost any relayless receiver — one set of batteries for savings in weight.

No. 14K28—Mini GG Actuator Package.....\$7.95

## COMMANDER R/O PULSE PACKAGES Ideal for Beginners and Sports Fliers

This is the R/C of 1969! We felt the acceptance would be good, but we hadn't visualized the phenomenal demand! Simple Single Channel is the upswing, but definitely!

The Commander R/O packages contain the Commander 2.4 superhet receiver, Commander Pulse Transmitter, Adams actuator size of your choice, and nickel cads, wired with on-off switch. AND each package saves you \$10.00 over buying components separately.

The R/O Packages are available in 3 sizes for most sporting needs from the smallest to the larger aircraft—or boats. Ready for installation, completely wired and tested.

The Baby is for .010 to .019 jobs. Has two 225 ma Nickel Cadmiums and the regular Baby Adams. Airborne weight is 2.5 oz.

The Standard uses the LV Single Adams for more power for .049 to .07 size. Uses larger capacity nickel cads. Airborne weight is 4.5 oz.

The Stomper uses the LV Twin Adams actuator for up to .15, or can be boosted for .19. Airborne weight is 4.9 oz.

(Charging equipment extra)

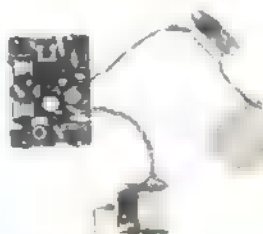
No. 10G15—Commander R/O Baby pkg.....\$69.95

No. 10G16—Commander R/O Standard pkg.....71.95

No. 10G17—Commander R/O Stomper.....74.95

Available all 27 MHz, except 27.255. Specify.

## PULSE COMMANDER



## PROVEN WINNER!

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### IN KIT FORM ■ ASSEMBLED

Will charge nickel cadmium batteries—20 mils to 150 mils. Capable of charging up to 12 volt packs. Indexed dial ■ simple chart for correct milliamp reading for charging different size battery packs. Completely isolated from line supply. An extra deluxe item. New transformer of highest quality. UL approved line cord. On-off switch. 500 milliamp diode. Full instructions.

No. 34K21—Ace Vari-Charger assembled \$8.95

No. 34K22—Ace Vari-Charger Kit 7.50

## NEW HANDBOOK-CATALOG FOR 1969!

### For the Fun Flyer and Tinkerer

Our 1969 Handbook-Catalog is bigger and better ever. ■ specialize in equipment for the Beginner, Sunday and Fun Flyer. More items for the do-it-yourselfer; more products from most major manufacturers, in addition ■ many Ace exclusives. Greatly enlarged HANDBOOK section. Last year this was called "bible for R/C", "a MUST!" by R/C editors. Price is just \$1.00 POST-PAID. This is completely refundable ■ your first order! And that order also puts you on our mail ■ for our newsletters and R/C Data Service —claimed the world over. You can't lose—send your buck on a round trip today. It could be the best dollar you ever spent!



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# NEW PRODUCTS

## CHECK LIST

Continued from page 3

**Sterling Models/The Winder.** Many claim this to be the best control-line combat ship they've ever flown. New design features make possible, at 120 mph, incredible maneuverability. Wing span — 42½". Prefabrication of diecut and shaped parts — a fast and accurate assembly. Kit price is just \$4.95.

Sterling has followed their super, scale-detailed Stearman with another well-known aircraft, the WWI S.E.5a. Scale is 1½" to the ft. and it results in a span of 42½" — a good size for the radio gear in current use. Complete kit has balsa, plywood and maple accurately shaped and diecut. The landing gear and center wing struts are formed. Plastic parts — machine guns, portions of the cowl — are well-detailed. The hardware pack includes Nylon tube pushrods, control horns and bellcranks. Step-by-step instructions, layouts and drawings make assembly easy. Kit price is \$21.95. Write: STERLING MODELS, Belfield & Wister Sts., Philadelphia, Penna. 19144.



**Astro Flight/Malibu Sailplane.** This R/C glider was designed for towline use — a slope soarer. Lightweight (16-18 oz. empty) airframe results from an all-balsa monocoque construction. Wing span is 76" and with a 12:1 aspect ratio, the area is 450 squares. A low-drag NACA 4412 airfoil is used on Malibu's wing. Flying weight will run 30-36 oz. Kit of pre-cut parts is easily and quickly assembled. Price is \$19.95 ppd. Write: ASTRO FLIGHT, INC., 2301 Cheryl Place, Los Angeles, Calif. 90049.



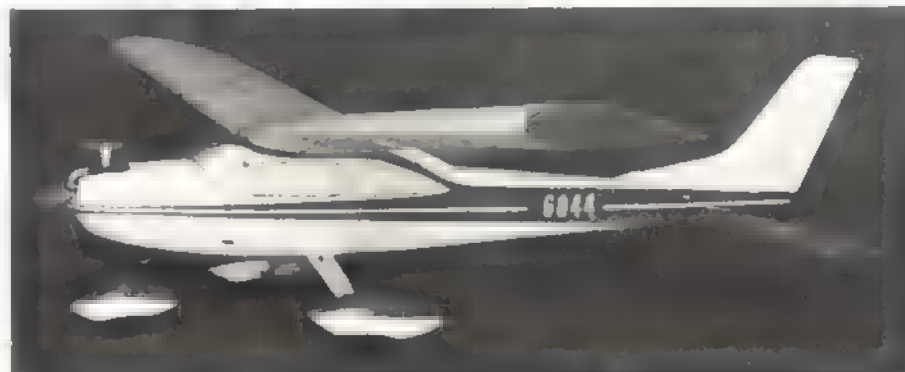
**W. C. Hannan Graphics Vintage Wheels.** Hear this scale fans. These new wheels have the look of the vintage types seen on old-time aircraft. Centers of the lightweight yet strong wheels are clear plastic (you may even scribe on spokes as desired). Flexible tires are black. Three diameters available: 1, 1½, and 1¾" at 65c, 75c and 98c per pair respectively. They will certainly save the

time and effort needed to build-up spoke wheels for your particular crate. By the way the same sizes are offered with opaque, gray centers at 59c, 69c and 89c per pair. Model car buffs might find these handy to use on classic autos — there are some of you that remember solid disc, auto wheels, aren't there?

W. C. Hannan Graphics also have a new catalog ready. Send them 25c to cover postage and handling. All of their items are listed — plans, things, Pirelli rubber and other goodies. W. C. HANNAN GRAPHICS, P. O. Box 1596, Escondido, Calif. 92025.

**Monogram Model/WWII Plastic Kits.** First of these is the 1/48 scale Dornier DO17Z German bomber. Early in the war this aircraft was used in the invasion of the Low Countries, Poland and France. Cockpit includes seats, floor, control column, instrument panel and crewmen figures. Assemble it with gear in flight or landing position. Price of kit PA214 is \$1.50.

In 1/48 scale is the British Hawker Typhoon. A dual purpose aircraft it was used as a bomber interceptor and ground support fighter. Cockpit interior is fully detailed with pilot. Assemble with canopy open or closed. Price of PA213 kit is \$1.50. MONOGRAM MODELS, INC., 8601 Waukegan Rd., Morton Grove, Ill. 60053.



**Product 60 Hobbies/Crash Resistant R/C Models.** This series uses a completely new, tough resilient plastic preformed fuselage. They are guaranteed by the manufacturer to be tougher than fiberglass and more survivable under impact than any other known plastic currently being used in preformed planes. First in this series is the Skylane 44 (at top). It's ideal for single channel and GG flyers. Suggested engine sizes are: .049 for rudder-only, .09 for galloping ghost, tiny digital and .15 for heavier radio gear. On the last size the wing should have spars installed (included with kit). Kit comes with assembled fuselage, Midwest

wing and stab. Just install motor, landing gear and hinging. Standard kit is \$21.95; deluxe kit, with wheel pants and strut covers, is \$24.95.

Next is the Comanche B with scale appearance and a performance that ranges from cool (scale) to hot (pylon racer). Manufacturer recommends engines from .15 to .35. Latter is advised for experts only. There is a choice of motor mounts so specify vertical, horizontal or inverted. All surfaces are covered and hinged. Wing and stab are styrofoam and covered. For additional details: PRODUCT 60 HOBBIES, P. O. Box 19133, Salt Lake City, Utah 84119.



# the hot ones in R/C

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### NEW SMALLER LIGHTER RECEIVER



The new Heathkit GDA-19-2 receiver combines Heath engineering with extremely small size • weight to deliver unmatched performance and reliability. Ceramic filters for increased selectivity, extra reliability and elimination of alignment forever. Miniature size ... you put this receiver places others won't fit. Light in weight ... flying weight of receiver and new flat-pack battery is only 6.2 oz. Highly sensitive, immune to noise, unaffected by temperature ... and available on five frequencies in any one of three different bands.

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**Kit GDA-47-6**, plug conversion kit for using new GDA-19-2 receiver with previous GD-47 R/C System, 1 lb. ... **\$2.95\***

**Complete Airborne System Weight:** 16 oz. (1 receiver, 1 receiver battery, 1 switch, and 4 servos). **Total Flying Time:** four hours minimum (with batteries fully charged). **Operating Frequencies:** 27 MHz (11 meters) — 26.995, 27.045, 27.095, 27.145 & 27.195 MHz; 53 MHz (6 meters) ... Amateur Radio operator's license required) — 53.100, 53.200, 53.300, 53.400 & 53.500 MHz; 72 MHz (4 meters) — 72.080, 72.240, 72.400, 72.560 & 72.720 MHz.

## NEW Heathkit® GD-69 "Thumb-Tach"



NEW  
Kit GD-69  
**\$19.95\***

### At Last An Accurate, Easy-To-Use Tachometer To Measure RPM's On Any Model Engine

The new Heathkit GD-69 "Thumb-Tach" Tachometer features all solid-state design and battery operation for long life reliability. And the "Thumb-Tach" is so low in cost, so functional, no modeler can afford to without it. Can be used on model planes, boats, and cars.

**Accurate ... Doesn't Load Engine.** There's no mechanical or electrical connection between your engine and the GD-69 ... it measures RPM directly using reflected ambient light from the propeller or flywheel of your model ... operates even from several feet away.

**Simple To Use.** Just set the handy slide switch to the meter scale you want to use ... Low (0-5000 RPM) for idle adjustments or High (0-25,000 RPM) for top end RPM readings ... and aim the lens at the propeller or flywheel. The meter directly in RPM. Easily calibrated for single pulse inputs (marked flywheels) and two and three pulse inputs (two & three bladed propellers). A handy pull-out stand lets you use both hands for making engine adjustments too.

**Dozens Of Uses:** • needle valve adjustments • difference in performance from one fuel to another • difference in glow plug performance • adjust engines to manufacturer's RPM • select gear trains and props • indicates power loss due to aging or worn engine parts • shows changes in peak RPM that you can't hear • especially useful for free-flighters, where a few more RPM can be the difference between winning or losing. And the GD-69 is easy to build too ... just 2-3 hours assembly on one circuit board. Raise your engine performance now ... with the new Heathkit GD-69.

**Kit GD-69, 1 lb. ... \$19.95\***

**GD-69 SPECIFICATIONS — Range:** 0-25,000 RPM. **Light Intensity:** Dusk to bright sunlight. **Ratio:** 1, 2, or 3 input pulses per RPM. **Battery requirements:** 9 V. NEDA #1604 (not supplied). **Finish:** Blue wrinkle. **Accuracy:** 3%. **Dimensions:** 1 1/2" H x 2 1/2" W x 5 3/4" L. **Temperature range:** 0° to 160° F. **Net weight:** 10 oz. less battery.



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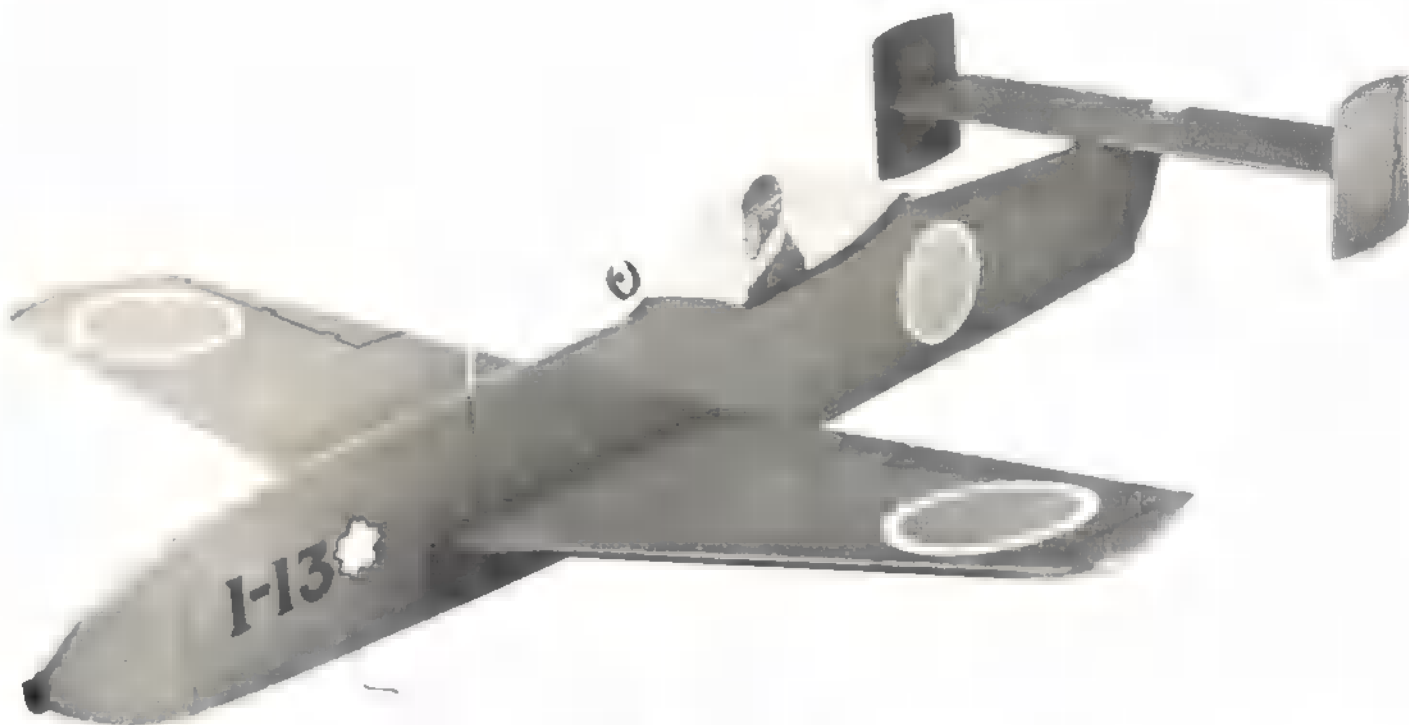
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\*Mail order prices; F.O.B. factory.

Prices & specifications subject to change without notice.

GX-193



# Balsa Baka Bomb

Our profile version of this one-way, piloted bomb is  
launched by catapult; original was bomber-carried.

W. C. HANNAN

THE Japanese "Baka" series of piloted bombs were developed as an emergency effort, toward the later stages of WW II, in an attempt to thwart the Allied naval attacks. These little one-way bombers were generally carried by twin-engined "Betty's" to within about 50 miles of the intended targets, whereupon the Bakas were released to glide the remaining distance, assisted during the terminal phase by three rear-mounted rockets.

The U. S. Navy bestowed the name Baka (fool) upon the tiny machines, but the Japanese referred to them as "OKAs" meaning Cherry Blossoms. Some examples of these aircraft are still in existence. One is on display at the Ontario Air Museum, Ontario, California; another is in the Air Force Museum, Dayton, Ohio, and at least one more may be viewed in Southern Japan.

Although several variations of Bakas were produced (even a two-seater!), our little catapult glider is based upon the OKA-11.

**Construction:** Here's a chance to use up some of that heavy balsa wood left over from the last kit that you bought! This bird should be built from medium-hard or hard balsa, in the interests of ruggedness. Extra weight will merely mean that it will need to fly a bit faster.

**Fuselage:** Trace the outlines of the fuselage onto thin paper, which will serve as a template. Transfer the outline shape to a sheet of flat (not warped)  $\frac{1}{8}$ " balsa. Cut the fuselage to size, being careful to preserve the alignment of the wing opening

and stabilizer mounting area. The section of the fuselage beneath the wing is removed, to be replaced during assembly. Give the fuselage a good overall sandpapering, and round all corners to a smooth contour, with the exception of the stab mounting area, which is left square. Cut two cockpit canopy halves from fairly thick clear  $\frac{1}{8}$ " sheet. A groove is made in the top of the fuselage to receive them.

**Wing:** A sheet of  $\frac{1}{8}$ " flat sheet balsa is used for the wing. After cutting the wing to outline, shape it to an airfoil section, as indicated on the fuselage side view. A razor plane and a sanding block will make short work of this operation. Slice the wing at the centerline, and bevel the inner sides to achieve the correct dihedral angle. Rub a little glue into each side, reglue, and block up one wing tip, while the joint dries.

**Empennage:** The tailplanes are cut to shape from  $\frac{1}{8}$ " sheet balsa, and sanded to a streamline cross-section. Be sure that the stabilizer ends are parallel, so that the fin-rudders will not toe in or out, when the model is assembled.

**Decor:** It is easiest to decorate the Baka before assembly. All surfaces are given two coats of sanding sealer, with sanding between coats. If commercial sealer is not readily available, you may make some from thin clear dope and talcum powder. We elected to apply only a minimum-type of finish, consisting of two coats of sealer, plus two coats of color, in the interest of saving time, rather than weight. The various lines which represent aileron, elevator, rudder separations and such, are drawn on with india ink or a ball-point pen. Don't omit these, as your model will look stark and unfinished. A coat of clear

dope will give the markings protection against moisture. The Japanese "meatball" insignias may be made from sheet decal material, or even paper disks, if you prefer. The small cherry blossom emblems are cut from pink-colored paper.

**Assembly:** Install the wing, being certain to check for correct alignment as viewed from the front and top, as well as the side. Don't spare the glue, because this joint will be subjected to severe stresses during catapult launches, and those occasional "dorks." Next, trim and install the lower section of the fuselage.

The fins may be glued to the stabilizer, bearing in mind the importance of keeping them parallel. The tail assembly may then be glued onto the fuselage, again checking for correct relationship. The decalage shown on the plans is recommended for good stability, but if you are more interested in top performance, particularly in respect to obtaining maximum altitude, the stab may be reset at or near zero degrees, in relation to the fuselage reference line. Naturally this will make launching much more critical, and is not recommended for beginners.

Sandwich the little folded paper pilot between the cockpit canopy halves, and insert the assembly into the fuselage groove. If desired, the various canopy frames may be simulated with strips of chart tape. Actually, the visual effect is quite good, even without them. Finally, as a finishing touch add the little ring and bead sights, which may be made from shim brass and wire.

**Flying:** Finishing nails or strips of solder are inserted into the fuselage nose as re-

Continued on page 51



1/8" SHEET BALSA WING

FIN IS NOT SHOWN ON THIS SIDE, FOR CLARITY

FOR ADDITIONAL BAKA INFO SEE:  
KAMIKAZE (AERO PUBLISHERS)  
MODEL AIRPLANE NEWS OCT. 1945  
HAWK PLASTIC KIT

# FULL-SIZE DRAWING

## COLOR SCHEME

OVERALL: PEA GREEN  
CIRCULAR INSIGNIAS: ORANGE-RED  
WITH WHITE OUTLINES  
"I-13": BLACK  
CHERRY BLOSSOM: PINK



SHEET ACETATE CANOPY



FRONT VIEW  
(NOT TO SCALE)

1/16" SHEET  
BALSA  
STABILIZER

1/16" SHEET  
BALSA FIN  
(MAKE TWO)

INSERT SOLDER  
OR FINISHING NAILS  
INTO NOSE  
FOR BALLAST

RING SIGHT

BEAD SIGHT

I-13

▲  
BALANCE POINT

1/8" SHEET BALSA FUSELAGE

THIS PORTION OF FUSELAGE  
IS REMOVED TO INSTALL WING

MUSIC WIRE LAUNCHING HOOK

# **Baka Bomb**

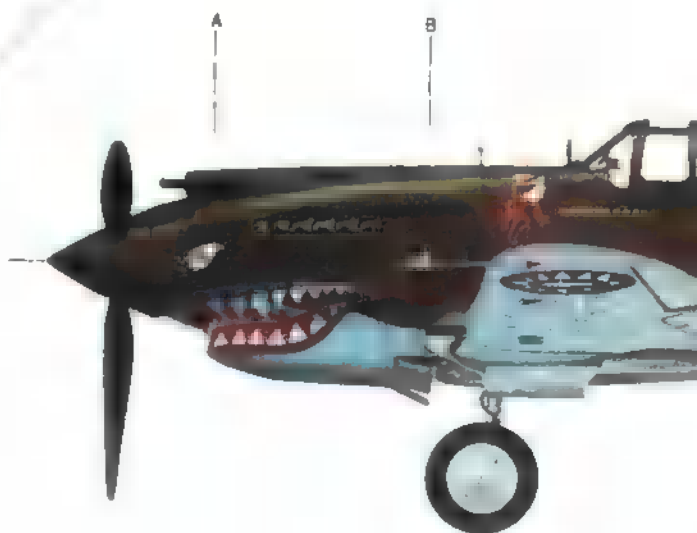
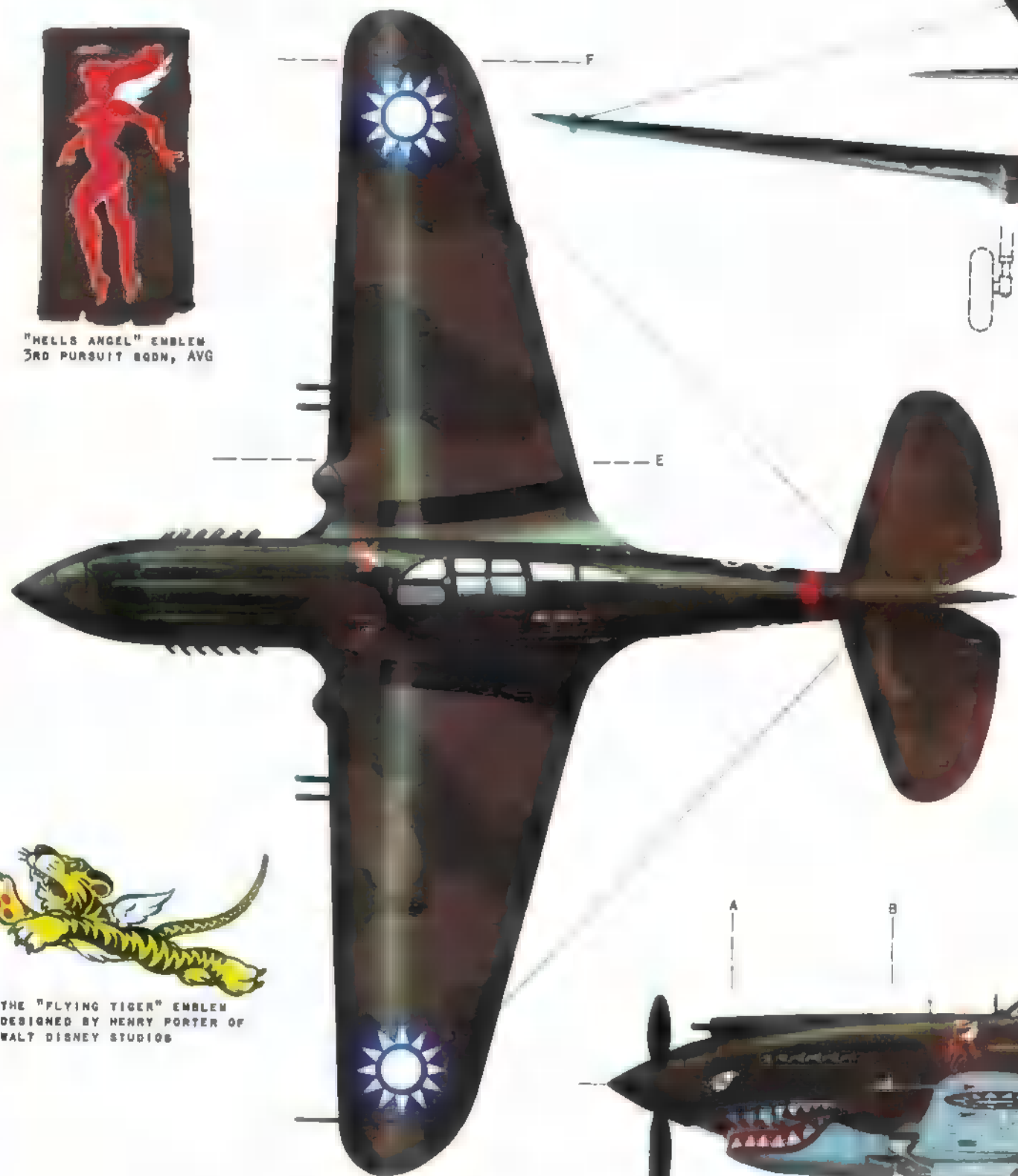
BY W. C. HANNAN



"HELLS ANGEL" EMBLEM  
3RD PURSUIT BGDN, AVG



THE "FLYING TIGER" EMBLEM  
DESIGNED BY HENRY PORTER OF  
WALT DISNEY STUDIOS





## CURTISS HAWK 81 A-3 (TOMAHAWK) (P-40C)

Flown by C. H. Older, American Volunteer Group, 3rd Pursuit Squadron, Mingaldon, Burma, (Jan. 1943) in defense of Burma Road. Powerplant was Allison V-1710-33, rated 1,150 hp takeoff. Top speed 345 mph at 15,000 ft.

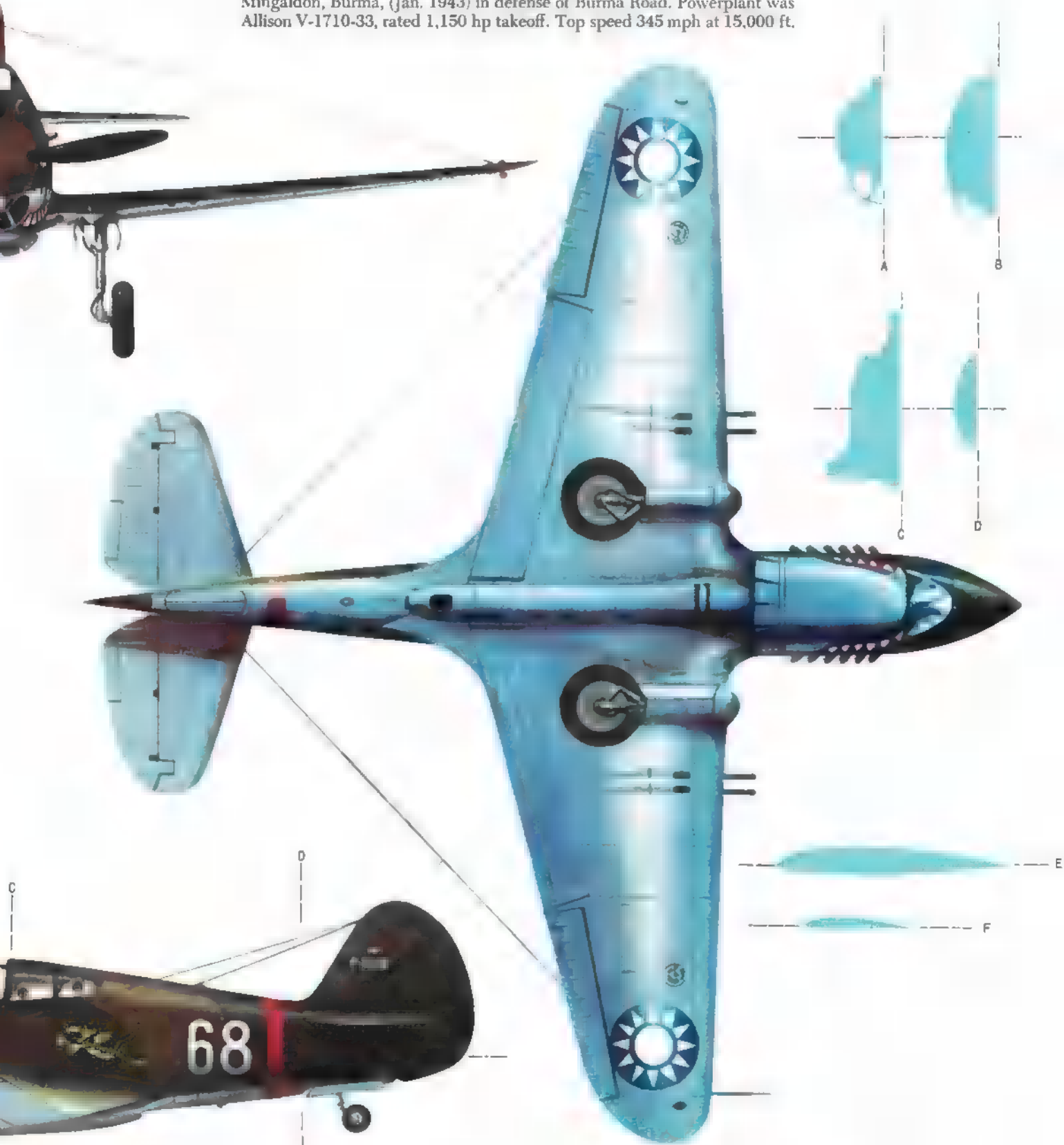


Illustration by  
Karl L. Stinson

# GETTING STARTED IN R/C

Glitches are not losses of signal, and are common only to proportional control systems.

## HOWARD MC ENTEE

LAST month we saw that while a half-wave long antenna (roughly 18' for 27 MHz) is the best radiator, we can get along with one of only 3-5' — our transmitters. We also saw that an antenna held vertically has the "cleanest" antenna pattern — one that's reasonably predictable. Some European transmitters (notably those from Germany) are so constructed that when the flyer holds them at a handy angle in front of him, the antenna is practically vertical. However, you can't knock success; our U.S.A. transmitters held in any old haphazard way still do a fine job!

As frequency goes upward, electronic equipment becomes less efficient. But, antennas get shorter and therefore they become closer to the ideal half-wavelength. Even though we can load a short antenna to look like a half-wave to the transmitter, all loading schemes reduce radiation efficiency. At 72 MHz a half-wavelength is only about 7' — a quarter-wave near 3½'. This length may be had without loading, so 72 MHz antennas are quite efficient.

Now, how about those glitches, which started all this discussion? The signal from your antenna doesn't reach your model like a clean beam from a searchlight. It bounces off the ground near the antenna, off nearby hills, off metal structures (metal building roofs, water tanks, electrical wires of all sorts). In Fig. 1 we see the main signal running to the plane direct, but how about all those bouncing sigs?! Those of you living near large cities know how a TV picture is affected when a large plane flies overhead. You don't entirely lose the picture, but it becomes very garbled for a

few moments. Why? Because the signal from the TV transmitter antenna is reaching your house antenna in a direct line, but it's also bouncing off the plane and reaching you in a very slightly different time.

Engineers say the two sigs are "out of phase." Thus, they partially cancel and your picture jitters wildly. The same thing happens with your model. One of those bouncing sigs is out of phase with the direct signal between antennas, and strong enough to cause a garbled signal in the receiver. This condition prevails for only a moment, but it's long enough for your plane to give a noticeable twitch. On planes whose receivers have fail-safe, you will probably hear the engine drop toward idle speed for a moment.

Glitches are a loss of signal. They can occur nearby or at a distance. It all depends upon the surroundings, to some extent upon the attitude of the plane, possibly on the attitude of the transmitter antenna. In familiar surroundings you can virtually predict where you will get a glitch. We recall one plane that would always do this (when flying at the local club field) when it was about 100' high and 500' away to the Southeast (above a certain clump of trees) and headed right in a sweeping turn. Probably the trees had nothing to do with it, but at that particular spot the reflections were just right to give a partial signal scrambling, and the plane wobbled for a few feet accordingly. Possibly a different antenna angle would have foiled that particular glitch — and shifting our flying position certainly would have done so. But the glitch just wasn't that bothersome to take the trouble!

Why do we get glitches with propo systems, when escapement and reed systems

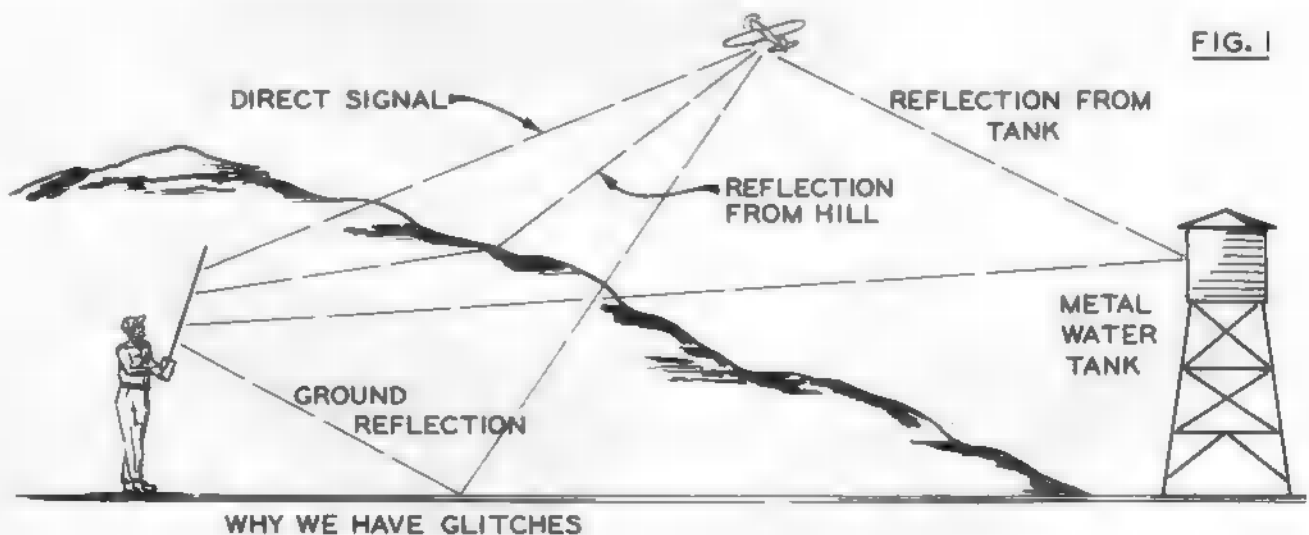
were never bothered? Simply because all propo systems, from the simplest pulse rudder to the most complex multi-digital, require a steady and uninterrupted train of signals from transmitter to model. Escapement and reed planes do not; much of the time they are flying straight and level. When doing so a signal cancellation or potential glitch would never be noticed. On the rare occasions when they were noticed, they were usually just considered to be passing interference.

Now, what about receiver antennas? Tuned antennas (that is, tuned via loading or otherwise to be a half-wave at the signal frequency) definitely give the best pickup — the most sensitivity and longest range. The truth is, we just don't need them. Super-regens will often quit working when hooked to a tuned antenna (it stops the input transistor from oscillating). But they are so sensitive that just a short wire will do a good enough pickup job. Superhets usually need longer antennas than regens, but again, not a full half-wave long.

Regens have only one tuning control, which sets the receiver frequency to match your transmitter; you have to do this tuning job to attain satisfactory operation. However, a superhet is internally tuned to the correct frequency by the crystal you insert. With matched transmitter and receiver crystals you will always get good reception at short range. At longer ranges you may not, unless you tune the antenna coil after the equipment installation has been completed in your model. Don't neglect this vital step, whenever you shift the receiver to a different model.

The most accurate tuning of any plane receiver is had when the plane is held off

Continued on page 51



Glitches are caused by slight cancellations of the transmitted signal. A reflected signal arrives at the plane but, having traveled a greater distance, it gets there later than the direct signal.

If the time of arrival of these two signals is enough out of phase, the receiver is confused and causes a glitch. Fortunately, the aircraft flies on and control is then quickly regained.



JULY 1969

# MODEL AVIATION

Official magazine

# A.M.A. NEWS



Academy of Model Aeronautics • 1239 Vermont Avenue N.W. Washington, DC 20005

INTERESTED IN JOINING A.M.A.? Over 25,000 did in 1968. Membership details may be had by requesting FREE BROCHURE from above address.

## The AMA Executive Council Meeting

**When and where:** February 28, 1969; Toledo, Ohio.

### The agenda:

**Nats events:** Following a report of the Nats Planning Conference (February 18-19 at Willow Grove Naval Air Station) by Nationals Executive Committee Chairman Earl Witt, a motion was made to accept the event schedule as previously presented to the Executive Council. **Approved unanimously.**

### Possible by-laws changes:

1. **Disciplinary action.** Discussion noted that sportsmanship was the area of concern, particularly with competitive flying. Suggested was a temporary suspension instead of termination of membership. District II offered to present a specific proposal for future council action.

2. **Nomination procedure.** Discussion of Nominating Committee procedures, including various proposals for a primary election, revealed that a majority of council members were satisfied with previous basic procedures, but there was general agreement that a specific procedural document should be drawn up and publicized. A motion was made to add to the by-laws a statement to say that nominating procedures would be in accordance with a council-approved Nominating Procedures document which would be published 90 days prior to the meeting of the Nominating Committee. (Note: by-laws changes must be ratified by Leader member vote.) **The motion passed: Yes, 10; Abstain, 2.**

Next there followed a series of motions to provide a Nomination Procedures document to be effective for the 1969 election:

a) that the candidates for national officer, president and secretary-treasurer, be limited to Leader members (including Contest Directors) who had served in the elective offices of the Academy and/or offices authorized by the by-laws for appointment by the president or vice presidents. **Approved unanimously.**

b) that requirements for candidates seeking the office of vice president would be as above, or any name endorsed by a currently chartered AMA club or active Contest Director. **Approved unanimously.**

c) that the Nominating Committee limit national officer candidates on the ballot to three and vice presidents to two; amended to two names plus write-ins. **The motion passed: Yes, 8; No, 4.**

District V noted for the record that he favors a primary type election but will go with the nomination procedures document for this year and will defer the primary question until later.

d) that the write-in provision for any elected officer of the Academy be provided, for members meeting the basic nomination requirements. **Approved unanimously.**

e) that the 1969 Nominating Committee meeting be held Wednesday night of Nats week at 8 p.m. at a site to be announced; also to be the cut-off time for accepting nominations. **Approved unanimously.**

3. **Adult Voting.** It was moved that the current council confirm the action taken by the 1968 council with regards to adult voting, but the motion was tabled, temporarily. It was then moved to submit to the Leader membership for vote a by-laws change which would revise the Junior category to be through age 14; with Senior to be 15 through 18; Open to be age 19 and over. **Approved unanimously.**

An amendment to the previous proposal was offered to provide for Open member voting only, provided the proposal for lowering the age categories is accepted. **The motion passed: Yes, 8; No, 2; Abstain, 2.** The previous motion, as amended, with regard to confirming action by the 1968 council, was voted upon. **The motion passed: Yes, 9; No, 2; Abstain, 1.**

**CB standards:** The need was explained for a review of current policy concerning free memberships to CD's; noting various inequities. It was pointed out that a Contest Board study on the subject was underway. Action was, therefore, tabled pending the outcome of this study. Meanwhile the previous policy remains in effect.

**Special Junior clubs:** A special Junior club program was described as having run into some snags which needed to be worked out with the Philadelphia Recreation Department, hopefully in time for a report at the Nats Executive Council meeting. Council action was deferred until a further report could be made.

**PR proposal:** Patton read a letter from John Clemens applying for the position of part-time public relations officer. Discus-

sion followed after which a motion was made that Clemens' proposal be accepted on a limited basis, to be reviewed at the Nats for possible continuance. Salary and expenses were approved for four months (trial period mid-March to mid-July), with expenses for travel to Washington, D.C. for HQ visit to be authorized immediately. **Approved unanimously.**

**Redistricting:** John Pond, as Chairman of a previously appointed study committee, read his report on redistricting. The report concluded without recommending any district changes. Discussion followed concerning efforts in Districts II and III to resolve representation problems. Noted was a very recent meeting between District II AMA officers which had produced a recommendation that, instead of redistricting, a system of associate vice-president appointments be adopted. Further discussion revealed general council agreement favoring the associate VP idea. A motion was made to table the redistricting question in favor of associate vice presidents (up to four per district) to be appointed by the district vice president who would delegate all responsibilities except vote in council. **Approved unanimously.**

It was agreed that a letter would be sent by HQ to the selected individuals outlining their duties and responsibilities. Patton commended Pond on the thoroughness of his report.

**Scholarship program:** Cliff Telford, as chairman of AMA's Scholarship Committee, reported on progress of the scholarship program. He noted that the National Merit Scholarship Corporation would not be able to handle the Academy scholarship due to complications in candidate identification. He also noted the need for increasing the minimum standards for qualification. A



Present at the February 28 AMA Executive Council meeting at Toledo were (L to R) John Pond, representative of the District X Vice President; Bill Lonk, Dist. VIII VP; Stan Chilton, Dist. IX VP; Earl Witt, Secretary-Treasurer; Lucille Ward, AMA HQ Office Manager; John Patton, President; John Worth, Executive Director; Jack Jasaitis, Dist. VII VP; Jim Kirkland, Dist. V VP; Art Schroeder, Dist. II VP; Gosta Johnson, Dist. VI VP; Cliff Telford, Dist. IV VP.

motion was made requiring, as a minimum standard, that the applicant submit a certificate as evidence that he had flown a model in AMA sanctioned competition, to be signed by a current CD. **Approved unanimously.**

Instructions to initiate publicity regarding the first scholarship, to be awarded by the fall of 1970, were approved.

**Societies within AMA:** After discussion, which noted that the president had appointed a committee to study the question, and that the committee was to meet at Toledo the next day, no action was taken pending receipt of recommendations from the committee.

**Insurance program:** Insurance proposals were reviewed concerning fire legal liability and accident coverage. Discussion developed a basic agreement that clubs should not be asked to pay any more than current fees. It was also noted that the present insurance coverage already provided fire legal liability for all clubs except those which owned or rented property, and that the latter clubs could get this coverage individually (details to be publicized by HQ). Accident insurance was acknowledged to be more advantageous but should be considered for future programs rather than currently. No further action was taken on the

proposals.

**Long-term membership:** No action taken as discussion indicated no real advantage was apparent and that some problems in special handling would be involved.

**Distinguished Service Awards:** **Approved unanimously** were distinguished service awards for **Willis Brown** and **Walt Billett** for their efforts in compiling the AMA History; to **Bob Veir** for his efforts on behalf of the Academy, especially for his work on the AMA-HIAA-Navy Regional Meet Program. (Not until after the meeting was it learned that Billett had passed away several days before.)

**Hutchinson article:** A newsletter article regarding AMA's contract arrangement with *American Aircraft Modeler* was discussed, during which were considered various means of countering the article's implications. These were deferred in favor of publicizing the fact that AMA was open to offers from any publisher. It was proposed that a letter be sent periodically to all general interest model magazines, in which minimum conditions for bidding on Model Aviation would be detailed, similar to one previously sent to a publisher. It was noted, however, that the letter should also indicate that AMA was not seeking to change its current arrangement, but was receptive

to any proposals.

**Budget for 1969:** Copies were distributed of the 1968 financial statement which indicated a better than break-even year. Also reported on was a budget which was based on 25,000 member total for the year. It was pointed out, for the record, that the Academy was now operating with an advance budget rather than on the day-to-day basis of the past.

**FAI teams events:** A report was given on finances for FAI team budgeting, noting that present and past operations were within budget but that future team expansion might exceed amounts available. If so, the council would be asked to decide apportionments. The FAI article in the May 1969 AMA News section of *American Aircraft Modeler* was noted for reference.

Discussion followed regarding FAI rules and events which are equivalent to AMA rules and events. It was moved to charge the Contest Boards with the responsibility of determining the feasibility of dropping equivalent AMA events, so as to eliminate duplicating activity. **Approved unanimously.**

Noting that the council had completed all advance agenda items plus considerable extra business, there was unanimous agreement to adjourn the meeting. The meeting had started at 9:15 am, was adjourned at 4:45 pm. AMA President John Patton thanked the Executive Council members for their excellent cooperation in completing all business within the originally scheduled time period.

## Observations by the AMA President



tell you about several other things related to the council meeting.

Most of us arrived in Toledo sometime Thursday evening. John Worth (AMA's executive director) and I drove out together from Frederick, Maryland. It gave us about eight hours to talk about Academy business while we were driving.

Our meeting started at 9:15 on Friday morning. It lasted until 4:45 pm, during which time sixteen different agenda items were explored and most were acted upon—more items than had originally been scheduled. It was a thoroughly business-like achievement.

All districts but two were represented. Eva Biddle from District III and Bob Stallick, District XI, were not able to make it. Vic Cunningham wasn't able to come but he did arrange to have John Pond attend the meeting and vote for District X. I believe this was the highest attendance to any Executive Council meeting, with twelve of the total of fourteen members present. Let me tell you of the council members who were there: **Cliff Piper**, a sharp New England businessman; **Art Schroeder**, a school principal from New Jersey; **Cliff Telford**, an airlines pilot (he flies Electras) from Maryland; **Jim Kirkland**, an outstanding solid-thinking ex-Air Force veteran from Florida; **Gosta Johnson**, a fine Chicago gentleman who is a buyer for a huge printing equipment manufacturer; **Jack Josaitis**, a very well known hobby dealer (World Wide Radio) from Michigan; **Bill Lank**, a drafting supervisor from Dallas (just being from

Texas is enough!); **Stan Chilton**, another fine gentleman who owns and operates a large music business in Kansas; **Earl Witt**, supervisory post engineer at a large military installation in Pennsylvania; **John Pond**, a famous "old-timer" and mechanical engineer from the San Francisco area, and our very able AMA executive director, **John Worth**, from Washington, D. C.

Every one of these men is an outstanding person. They are very sincere in their efforts to make the right decisions for what is best for model aviation. Each of them made a personal financial and family sacrifice in order to attend this council meeting. They are gentlemen who are very respected in their own business endeavors, and they should have the same trust and respect of the membership in their AMA activities. I guess this brings me around to what I wanted to say. In the past I have heard comments from dissatisfied persons who claimed collusion, misrepresentation, shady-dealing, etc., in connection with executive actions. I'm sure this was only because someone did not know the full story of the complex problems in many seemingly simple decisions.

I must say that I believe that our Executive Council is made up of some of the finest, most sincere and dedicated modelers I have ever met. I have seen how they work considering all the aspects of a problem and then make honest democratic decisions. These are not always unanimous decisions, but since ours is a democratic organization, the majority determines the outcome. I'm sure you should and can trust your elected representatives to act in your best interests.

**John Patton**

**Note:** The AMA president is planning engineer with the telephone company in Frederick, Maryland; also president of the Kiwanis Club and secretary of the Frederick County Parks and Recreation Commission. For a further description of the AMA Executive Council and how it operates, the article in the October 1967 issue of *American Modeler* (pages 34-35) is recommended.

## FAI CL Team Program Status Report

The first stage of a two-part program to select U.S. teams for the 1970 Control Line World Championships is now in progress. The time period for the qualifying stage ends August 10, 1969. Events involved are FAI Speed, FAI Stunt and FAI Team Racing—refer to 1969 AMA rule book for event details.

At least twenty flyers in each of the three events (plus the 1966 and 1968 teams) will be qualified to fly in the Team Finals to be held at St. Louis, Mo., over the 1969 Labor Day weekend. The Team Finals is sponsored by the Yellow Jackets Model Airplane Club. The three top flyers in each category at the Team Finals will make up the U.S. teams.

There are two ways to qualify for the Team Finals. 1. Via ten designated AMA meets at which the highest placer in each of the FAI event categories, who is entered in the team selection program, will be automatically qualified for the Team Finals. 2. Via other AMA meets. At least ten flyers entered in the team selection program who have recorded the highest performances in each category prior to August 10 will be qualified for the Team Finals. Refer also to event details printed in the AMA News Extra section of the April *American Aircraft Modeler*.

The schedule of designated meets for direct qualification for the Team Finals:

**April 20.** Circle Burners Annual, Sepulveda Basin, Van Nuys, Calif. CD: T. Lowry.

**May 3-4.** High Point Model Air Meet, Spinners Flying Field, High Point, N.C. CD: L. W. Underwood.

**July 5-6.** Confederate Nats, Sebring, Fla. CD: Jerry Wagner, 274 E. 9th St., Hialeah, Fla. 33010.

**July 16-20.** National Model Airplane Championships, Willow Grove Naval Air Station, Pa. Note: Speed on 16th, Stunt and



Team Race on 20th.

July 27. Midwestern CL Championships, Municipal Model Flying Field, Dayton, Ohio. CD: C. China, 5028 Broughton Pl., Dayton, O. 45431.

Aug. 2-3. Jr. Air Races, Cleveland Model Flying Field, Ohio. CD: A. N. Montagino, 3911 Daisy Ave., Cleveland, O. 44109.

Note: Only six meets are listed, but ten are authorized. Those listed were confirmed at press time; others may have been added since this listing—a stamped, self-addressed envelope to AMA HQ will obtain the latest information.

## Nats Notes

**What:** The annual National Model Airplane Championships.

**Where:** Naval Air Station, Willow Grove, Pa., near Philadelphia, for outdoor events. Naval Air Station, Lakehurst, N. J., for indoor events. Nats HQ is at Willow Grove where all in-person entry and registration must be done.

**When:** July 14-20, 1969.

**Entry Forms:** Available by sending stamped, self-addressed envelope to Academy of Model Aeronautics, 1239 Vermont Ave. N. W., Washington, D. C. 20005.

**Advance Entry Deadline:** June 15, 1969 (postmark date of entry form mailing to AMA HQ).

**Late Fees** are increased this year to \$25 for Open Late Basic Entry Fee (no increase for Juniors or Seniors) and to \$10 for Late Event Entry Fees (for all ages), except RC events which remain \$5. Late fees are applicable when entry forms are not postmarked prior to midnight, June 15. The increased late fees, together with a new no-show policy, are intended to encourage advance entry by all who consider Nats entry a possibility even if not a certainty.

**No-show Policy:** The basic entry fee of modelers who enter in advance but who for some reason do not attend will automatically be applied to 1970 AMA membership. (Event fees cannot be credited, as such fees are needed to cover advance processing.)

**Registration vs Entry:** Entry is required first, either in advance by mail or at the Nats, by submitting entry form and entry fees. Registration is the checking in at the Nats, after entry, to receive Nats identification, instructions and latest information. Registration is the final step of entry which acknowledges contestant's presence on site and authorizes flying in the competition.

**Lodging:** Free housing on station to male contestants limited to 550. Priority will be given the first 550 advance entrants and mechanics who request housing—must be claimed on Monday by 2 pm, July 14. Camping on station for males and females permitted (self-contained trailer units only—no tents—no electricity or plumbing hook-ups).

**Meals** (breakfast and supper only) are available at station mess hall to contestants and mechanics, male and female, limited to 1,000. Cost is less than \$1 per day. Priority will be given the first 1,000 advance entrants and mechanics who request meals—priority must be claimed and meals paid for to a U. S. Navy official on Monday, July 14, prior to 2 pm.

**Membership Meeting:** As provided by the bylaws, the Executive Council is calling for the regular meeting of the AMA membership to be held this year during the National Contest at 7 pm Friday, July 18. Consult the bulletin board at Nats HQ for the exact location of the meeting. No agenda had been prepared at press time.

## Once Over

### Frequency Fund Donation



The AMA HQ booth at the Toledo RC Conference. Executive Director John Worth, left, and HQ clerk Gretchen Cantrell discuss membership processing. HQ Office Manager Lucille Ward types membership cards (almost 200 memberships were sold at the booth), while District I Vice President Cliff Piper, at right, distributes rule books. Over 4,000 paid admission to attend the Toledo show. The AMA chartered Weak Signals host club donated the AMA booth space plus \$586.50 to the AMA Frequency Fund—proceeds from the weekend raffle.

### Flies Against Record

A recent contest at Grand Junction, Colo., for indoor glider and paper-covered rubber models had both types competing against one another—not on just clocked time, but on clocked time as a percentage of club record in each age class of the sponsoring AMA chartered Grand Junction Modelers. This allowed "mixing apples with oranges." Winner was Jerry Rupe whose rubber model time of 4 minutes, 57 seconds, equalled 121% of the club's Senior record.

### FAI Control Line Events

Six of the Valley Circle Burners (Calif.) are included FAI Speed and FAI Team Racing in addition to other AMA control line events. This provides good opportunity for area flyers to qualify in the team selection program for the 1970 Control Line World Championships. "... it is hoped that some of the T R team will come from SC, since we furnish all or most of the speed team each time," said the SCAA Newsletter.

### BIRDS Sponsor RC Scale Team Shirts



Joe Bridi (L.), representing the U.S. 1969 FAI Scale Team, accepts the first of eight shirts donated by the AMA chartered B.I.R.D. Club of Signal Hill, Calif. Presenting the shirt is Bror Faber, club president. The shirts will be worn by team members Bridi, Maxey Hester, and Claude McCullough during the International RC Scale Contest this summer in Germany.



## Walter H. Billett

1880-1969

Following lengthy hospitalization Walter H. Billett, 88, succumbed on February 24 at Minneapolis, Minn.

Billett was a charter member of the Model Industry Assn. (now Hobby Industry Assn. of America) as well as the Association of Twin Cities Hobby Retailers, Minneapolis-St. Paul. For twenty-three years, until 1955, he ran a hobby shop and was a consistent backer of model meets and model clubs.

In recent years Walt was best known in connection with the fun and fund-raising activities of the Flying 8-Ball Club and the loving cup he created from a tinware hodgepodge of drain pipes, wash tubs, bread pans and assorted odds and ends.

Completion of the AMA History, which was published in mid-1968, absorbed Walt's final energies. The AMA Executive Council on February 28, unaware that Billett had passed on several days before, authorized the AMA Distinguished Service Award to Walt for that history effort.

The 8-Ball Club was a booster activity for AMA, and it served as sponsor of an annual "Shindig" at the National Model Meet, an affair which provided fun and festivities while honoring Navy, Hobby Industry and AMA personalities. Walt was known as the Chief Blooper of the 8-Ball Club and was the only six-star admiral among the club's top brass.

### Honors for Lopshire Book

Word recently received is that Bob Lopshire's book, *Beginners Guide to Building and Flying Model Airplanes*, has received an award from the Library of Congress as an outstanding children's book of 1968. Publisher is Harper & Row. Price: \$4.00, available to AMA members from AMA HQ. Lopshire is chairman of AMA's Junior Committee. The book normally sells for \$4.95.

### AMA Membership Given for Help

The AMA chartered District of Columbia Radio Control Club gives AMA membership (with AAM magazine) to youngsters whose parents have helped the club—who are not DCRC members. This gesture, which is extended to helpers who won't accept any other reward, has been well received.

### Origami Contest

An enjoyable time was had at the January meeting of the AMA chartered Utah State Aeromodelers (Salt Lake City) when they had a flying contest for folded paper airplanes. Events were for Door Prize (flying through a door), Spot Landing, Pylon

Continued on page 48

Robert Underwood, chairman of the Greater St. Louis Modeling Association, explains the Cub building contest program to young visitors to the mall exhibit. The association's second building/contest session in March had 104 preregistrants. Ninety-plus actually participated.



**SOUTH  
COUNTY  
CENTER**



PHOTOS BY BILL CRAME

## St. Louis—Beehive of Modeling Promotion

Modeling in the St. Louis, Mo., area is being promoted by means of a two-pronged effort of the Greater St. Louis Modeling Association. Long-range benefits are expected to be realized from this grass-roots program.

On the one hand the association is conducting instruction, building and contest sessions featuring the AMA Cub beginner's rubber-powered model. On the other it is arranging with shopping centers for manned displays of all types of models.

The Greater St. Louis Modeling Association is comprised of twelve clubs, eight control line, two free flight and two radio control. They are the Alton Area Thunderbolts, Granite City Steelers, Hot Heads, Kirkwood Thermaleers, Lafayette Esquad, McDonnell Douglas Free Flight, Phantom Flyers, St. Louisans, St. Louis Yellow Jackets, Signal Chasers, Spirits of St. Louis, and Throttlemasters.

An unexpected but cherished bonus has been the fellowship and understanding among the various modeling interests which has resulted from this large-scale participation on a man-to-man, modeler-to-modeler basis. Each who has participated can better understand his modeling brother and his particular fascinations and problems.

The building-flying program takes place over two nights (the initial program in January was at a school on Thursday and Friday evenings, 7-9 pm). Rank beginners were attracted. A parent or adult was required to accompany each child—thought by the association to be an important point as this allowed presentation of modeling to both. A 25c fee was charged to cover the AMA Cub kit and glue. Contest prizes were furnished by a local hobby dealer and the county parks department.

The first evening was used in several ways, commencing with introductory remarks about the association, representative clubs and the AMA, followed by brief information about the various types of model airplanes—free flight, control line

and radio control—then an eye-opening demonstration flight with an Easy Bee model. Comments were held to a minimum, so it was not long before the assembled group adjourned to waiting newspaper-covered cafeteria tables for building the models. A large number of experienced modelers were on hand, allowing for mostly individual instruction. Moms and dads joined the sons and daughters to build.

In just about an hour everyone had completed his Cub. While the glue was drying the group moved to the gym for demonstrations of adjusting and flying Cubs previously built.

The second night was for contest flying in two age brackets—6 to 9 and 10 to 12. Once again over thirty association club members were on hand to time, record and help with trimming and repairs. Each youngster was given three flights, and the total time for the three flights was recorded. Interestingly enough, in the association's first contest session, a six-year-old helped by a non-modeling mom (filling in for an out-of-town dad) posted the high time of the evening. Imagine the elation filling those two! No doubt dad is still hearing about it.

Prizes were awarded through ten places in each age group—model merchandise (simple rubber model kits, glue, modeling knives, etc.) and ribbons were given.

The association's first exhibit was in the enclosed mall area of the South County Shopping Center, from 9 am to 9 pm on Saturday. Rather than a simple static display, the association had club members on hand all day to explain the models and answer questions. During the day several modelers spent their time building AMA Cub models which were given away to youngsters. Thousands visited the display—many made a special trip just to view it.

The Greater St. Louis Modeling Association is proud of its accomplishments, and rightly so. Robert Underwood, association chairman, urges all clubs to investigate this kind of activity.



The heated indoor mall of the South County Center was ideal for winter exhibition. George Finch points out RC details for onlookers.





A brief part of the two-night building/flying program was taken for general descriptions of the various types of model airplanes.



The AMA Cub model is ideal for a beginner's program. It is quick to build and requires no special construction equipment. When ordered in lots of 1,000 (\$160), the wing covering can be printed with a sponsor's message at no additional cost. Request order blank from AMA HQ.



Building session looks hectic, but it really wasn't. Large number of volunteers from the sponsoring Greater St. Louis Modeling Association allowed individual instruction. Group instruction also works well.



Bob Hotze of the Kirkwood Thermalcoers helps the youngsters adjust their model. The Cub is designed with enough angular wing-stab difference to make safe flying—usually requires side thrust for spiral climb.



Mishaps do occur, and thus the repair table had its share of activity. Main trouble with repairs is that the youngsters are eager to fly that they have trouble waiting for the glue to dry adequately.

Right: Linda Sortorius begins building her model. Though mostly boys, several girls participated.

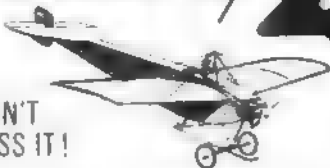


Below: Prizes are plentiful, to 10th place in two groups; nearly a third of the entries were winners. Words from Miss Margaret Kerr, school principal, reflect the results of the association's program: "The teachers say that nothing we have done has engendered much interest. The children are still talking about the fun they had, and the youngsters who did not participate are most envious."



# nffs SYMPO/2\*

DON'T  
MISS IT!



\*SYMPO/2 is the 2nd NFFS Symposium, to be held this year at Willow Grove NAS on July 15, 1969, 8 p.m. at the Chapel. Over a dozen papers will be presented by top free flight people. Hear the latest in technical, theoretical and practical FREE FLIGHT thinking. Plan to be there this year.

SUPPORT NFFS



## Once Over

Continued from page 45

Race and Endurance. Larry Sward was named high point winner following a fly-off between he and Jim Rhoades for a tie which resulted when modifiers (for bringing guests, entering all events, etc.) were added to the flight scores. Indications that there will be more fun-type activities at USA meetings.

## ARCS Annual Awards

The annual awards of the Greater Pittsburgh Aero Radio Control Society were presented earlier this year. Phil Catanzaro received the Hillman Trophy for Most Outstanding Service. George Trimmer won the Mehring Award for the Most Improved Flyer, while club Secretary Dick Meyer (of AMA Junior Committee fame) won the bowling ball with the 11 on it.

## Canadian FF World Champ Teams

Teams of Canada for the 1969 Free Flight World Championships, chosen in a three-day, 15-flight finals organized by the Model Aeronautics Assn. of Canada last year: Nordic A-2: W. R. Thompson (2070), J. McGillivray (2050), D. Surry (2035); FAI Power: J. Foley (2496), B. Eggleston (2400), J. Brooks (2225); Wakefield: G. McGlashan (2350), M. Thomas (2286), J. McGillivray (2156). Numbers in parentheses are 15-flight totals in seconds.

## Oklahoma Model Aircraft Assn.

The News Letter of the AMA chartered Tulsa Glue Dobbers Model Airplane Club indicates that the organizational meeting of the Oklahoma Model Aircraft Association was held at Tahlequah last January, hosted by the Tahlequah Chamber of Commerce. About 60 modelers from all parts of the state attended. The association is devoted to promoting all phases of model aviation.

## Penalty for No Name Plate

At a meeting of the AMA chartered Fresno (Calif.) Radio Modelers, Inc., earlier this year the members made an agreement that everyone would be required to wear a name

plate at all meetings, at the flying field and at all club activities. A fine of 25c will be imposed for appearing without a name plate, although this is waived days for new members.

## Working Toward Club Championship

Not only is the AMA chartered D. C. Maxcutters Club seeking candidates from among its membership to make up a team for the National Club Championships, it is already figuring on the possibility of a club elimination contest if too many want to be on the team. According to Max-Far, the club's paper, it was first thought that the team would have to fly a variety of classifications (gas power, non-gas power and control line), but the AMA rules were re-read and find out that this diversification is not required for club teams—only for individuals.

## WORKS to Require Mufflers

Ron Van Putte, editor of the WORK-SHEET, published by the AMA chartered Western Ohio Radio Kontrol Society, Dayton, says that the society's Board of Directors has stirred up a hornet's nest with a recent decision to require the use of mufflers. Yet, he says, "there is little question that we must begin to use mufflers if we are to retain the south flying field." The club B of D recommends that mufflers be installed before the club's big June contest. Any device which noticeably reduces the sound of an engine is acceptable—not required on an engine of less than .25 cu. in. Van Putte claims that there are very few existing club planes that can't be fitted with a muffler.

## New NFFS Directors

When Chuck Broadhurst and Bill Gieskieng became respectively executive director and editor of the National Free Flight Society, two vacancies were created—the NFFS Board of Directors. Unanimously elected to fill the unexpired terms were Lee Polansky, Pasadena, Calif., Western Director, and Jim Perdue, Tullahoma, Tenn., Director-at-Large.

## RC Fly-for-Fun

The Pensacola (Fla.) Aeromodelers (AMA chartered) held a Fly-for-Fun RC Contest last March according to The Trim Tab. This club paper, one of the most professional looking ones we have seen, is edited by Douglas Foote. The Fly-for-Fun Meet had four events: Carrier, Five-Minute Touch and Go (must start with prop off and restart engine every third touch), Chacane (with plane 25 yards distant, contestant runs to airplane with prop in hand and performs following in the shortest time—take-off, loop, roll, land, return prop to judge), and Balloon Bust.

## Bridge Generation Gap

Communication between Juniors and Seniors is much more likely than between Juniors and Opens, suggests Ralph Prey. This is why he feels Seniors be more instrumental in getting Juniors going in modeling than Opens, providing the latter make the tools available. These views were expressed in the Satellite, voice of the AMA chartered San Valeers (Calif.) Model Airplane Club. Specific examples of "tools" suggested by Prey are meets with combined Jr.-Sr. events and de-tuned competition model kits of moderate price which allow for use of already-owned engines—as from a discarded plastic model, for instance.

## RC Schneider Trophy Races

Word from Relay Chatter, publication of

the AMA chartered New England Radio Control Modelers, is that John Ross has proposed a new event for the Brimfield hydro meets—a takeoff on the Schneider Trophy races of the thirties. According to the paper, many club members are interested in building these float-equipped racers.

## NFFS "How To Build" Series

In addition to the Free Flight Symposium papers (to be presented at the Nats) the National Free Flight Society has another writing project in the works, a "how to build" series on all phases of free flight activity. Will Nakashima, MD, will be editor of the series. Depending upon the degree of success, the individual papers may eventually be published as a book, according to NFFS Executive Director Chuck Broadhurst.

## Bombs Away!

"No wonder they invented Norden bomb-sights," said the Mile Hi Newsletter, voice of the Denver, Colo., AMA chartered Mile Hi Radio Control Club. This was with regard to the club's first contest of the year which was for simulated bomb dropping. Many of the bombs were dropped as far as yards from the target, but Bill Kessler restored everyone's faith when he achieved a 10-foot average to win the event.

## Coffee Air-Foilers Awards

The Modeler of the Year awards of the AMA chartered Coffee Air-Foilers Model Airplane Club, Tullahoma, Tenn., were presented at its March meeting to Jim Perdue in the Open division and Brian Webster in the Junior class. Brian was the 1967 Junior winner as well, but he won't be eligible to win for 1969 because of a new ruling to prevent giving the award to the same person two years in a row. Stop-watches were given, a much needed item by most all modelers. The club instituted the awards in 1967 in order to encourage participation in all of the club activities, says Air-Foiler, the club's monthly newsletter.

## Pioneer RC Field Rules

The Pioneer RC Club (AMA chartered) welcomes visitors to attend club meetings and fly at its field in Sunnyvale, Calif., providing the field rules are adhered to. 1. Each RC flyer must be in possession of both a valid AMA and FCC license. 2. Use the pit area appropriate to the frequency of your equipment, as designated by color of flags. 3. Do not take off or hand launch your airplane immediately parallel to pit area. 4. Flying over pit areas or spectators is strictly prohibited. 5. No more than four airplanes are permitted to fly at one time. 6. Show common courtesy and fly safely.

## Linstrum New Symposium Editor

Dave Linstrum, St. Louis, Mo., has taken over the position of Free Flight Symposium Report Editor (for the 1969 Symposium) due to the unavoidable resignation of Dick Mathis. Linstrum will have a full load on his shoulders, what with being FF team program administrator, magazine reporter, and earning a living. Fortunately Mathis had already done much of the groundwork.

The bound volume of papers presented at the 1st Annual Free Flight Symposium which was held during the 1968 Nats is still available from AMA HQ. Over 100 pages, chock-full of FF goodies, the price is \$3.50 to AMA members.

WRITE AMA HQ FOR  
CHARTER CLUB INFORMATION



# AMA News Extra . . . . .

## FIRST AMA SCHOLARSHIP TO BE AWARDED IN 1970

The first AMA scholarship will be awarded in time to be used for 1970 fall enrollment in a college or university. This is in accordance with the proposal of the AMA Scholarship Committee, Cliff Telford, chairman, which was approved at the February Executive Council meeting (see meeting report, page 43). Earlier it had been thought that the award would be made in 1969, but this would not allow sufficient time to announce the program and coordinate the details.

Who is eligible? A high school age AMA member who has (1) flown a model in AMA sanctioned competition during 1969 and (2) participated through his school in the National Merit Qualifying Test which is conducted by the National Merit Scholarship Corporation.

Form required for scholarship consideration. This is available by sending a request with ■ self-addressed, stamped envelope to AMA HQ, 1239 Vermont Ave., N.W., Washington, D.C. 20005. The form, which the scholarship aspirant must take with him to an AMA sanctioned contest for the Contest Director to certify entry and official flights, must be completed and returned to AMA HQ by the end of Dec. 1969.

Criteria for award. Relative scholastic achievement among eligible modelers (see above) who reach the semifinal level in the National Merit Qualifying Test will be the prime factor the AMA Scholarship Committee will use in determining the winner. (The scholarship will not be awarded by the National Merit Scholarship Corp., but the results of their tests, conducted at schools throughout the country, will be used by the AMA Scholarship Committee.)

Amount of scholarship. The 1970 award, derived from contributions to the AMA Scholarship Fund, will be \$1,000--to be paid upon acceptance and enrollment in ■ institution of higher learning.

1971 and the future. Scholarships are expected to be awarded annually on a continuing basis, with amounts to be governed by contributions to the AMA Scholarship Fund. Such contributions, federal tax-deductible, are solicited.

## AMA SENDING INDOOR FLYERS TO RUMANIAN SALT MINE!

Yes, the U.S. team for the Indoor FAI World Championship in 1970 will be competing in ■ draft-free underground salt mine at Slanic Prahova (60 miles north of Bucharest). This site for the World Championship was chosen during the Bureau Meeting of the FAI Committee for International Aero Modeling in Paris last April, when Poland withdrew its previous offer to be host. The salt mine is huge--reported to have a total height of 215 feet. Probable contest date will be in March or April of 1970 when the humidity within the mine is at its lowest, 40-45%. The U.S. team selection program for this World Championship is currently in progress.

## CONTROL LINE SCALE WORLD CHAMPIONSHIP IN 1970?

Word is that France may expand its offer to host a Radio Control Scale World Championship in 1970, by offering to also include a Control Line Scale World Championship. The U.S. has endeavored to be represented by competing teams in all official FAI World Championships. Problem is that a final decision on authorizing the RC Scale World Championship (and also the possible extension to include CL) will not take place until the November Plenary Meeting of the FAI CIAM, ■ time too late to organize a team selection program by competition. Contingency plans have already been announced to pick the RC Scale team by using the 1969 Nats results. Most likely the 1969 Nats results for CL Scale would be used for selecting a CL Scale World Championship team if, in fact, a Championship is authorized by FAI in November.

## EVEN IF SPECTATOR, BRING YOUNGSTER TO NATS

If you go to the National Contest (Willow Grove Naval Air Station, Pa., July 14-20) as a contestant or spectator, we suggest that your children or youngsters or friends may have a ball by participating in the AMA Cub rubber model building-flying program which will take place every day, Wednesday through Saturday. Anyone not over age 16 may participate if he is not entered in regular competition events. There is no entry fee for the program, and each youngster will be given the AMA Cub kit and taught how to build and fly it. The winners of competitions each day will receive special prizes. In addition to the AMA Cub event, the other 1969 HIAA-AMA-Navy Regional Program events will be held: Hand-Launched Glider,  $\frac{1}{2}$ A Profile Proto Control Line, and  $\frac{1}{2}$ A Solo Race Control Line. Same age and entry requirements as for AMA Cub. See the June issue of American Aircraft Modeler for contest rules, or send ■ stamped self-addressed envelope to AMA HQ for same.

**By special arrangement with the publisher this ■ is produced at the very last minute, just before the magazine is printed, to bring you the latest news concerning current Academy of Model Aeronautics events of national significance.**

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Which officers live in your district? Select correct address when writing officers.

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X: Vic Cunningham, Sr., 4307 Hornbrook St., Baldwin Park, Calif. 91706

XI: R. D. Stalick, 2807 S. Oak St., Albany, Ore.

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- III: E. Biddle, 2156 Street Rd., Warrington, Penna. 18976 (East)

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VI: Wheland Webb, 15722 Vine Ave., Harvey, Ill. 60440

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W. Hartung, 14750 Kilbourne, Detroit, Mich. 48213 (South)

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## CD Tells How He Enforces B.O.M. Rule

How to enforce the Builder of the Model Rule (p. 8, 1969 AMA rule book) has been a problem faced by contest directors for years. Most have ignored it — the premise that the rule is unenforceable because violations are too difficult to detect. And, despite many studies and proposals to improve the rule it remains essentially the same.

But one CD with many years of contest officiating experience refuses to ignore the rule. He claims that a good job of enforcement can be done, if a CD will exercise some gumption and take time to try. The CD is Joe Radle, of New York's Der Luftmeisters model flying club. Here's how he says to do it:

I can't help getting the feeling that if people are having trouble with this basic and simple rule what terrible trouble they must be having with the more complicated event rules like say flying scale, precision acrobatics, etc. Without further delay I will attempt to give my interpretation of how to enforce the Builder of the Model rule:

1. Consider, first, the age and number of years building and the appearance of the model presented by the contestant. Judge should ask these questions or they should be answered — the — sheet by the contestant.

2. The Judge at this point should be able to make an initial determination. Either he feels the modeler probably did or probably did not complete the model according to rule 1.17. In any event he will investigate further by asking a few questions regarding origin of the model and construction techniques apparent by visual examination.

3. At this time he also make determination as to the acceptability of the model with regards to amount of prefabrication or simple put-together of the model as stated in 1.17. The Judge should, of course, be qualified, and he should be aware of the material available for models of the type flown in this particular event; i.e., speed pans, foam wings, etc., that currently available and do require additional work to complete the model. In addition, these and similar items are usually only portions

Continued on page 65

## CONTEST CALENDAR

Official Sanctioned Contests of the Academy of Model Aeronautics

May 30-June 1 — Marysville, Ohio (AA) Central Ohio FF Rally. Site: Lee Farm & Airstrip, L. Willis CD, 1006 E. 12th Ave., Columbus, Ohio 43211. Sponsor: Central Ohio FF Club.

May 31-June 1 — Spokane, Wash. (AA) Spokane RC Championships. Site: Geiger Field, Int. Airport, R. Carson CD, W. 3029 Hoffman, Spokane, Wash. 99205. Sponsor: Barons RC Model Club.

May 31-June 1 — Troy, N.Y. (AAA) Northeastern N.Y. State Invitational Model Airplane Meet for CL & RC. Site: Industrial Park, A. Hurd CD, 22 Racklin Lane, Loudonville, N.Y. 12121. Sponsor: Flying Knights MAC.

May 31-June 1 — Grand Junction, Colo. (AA) 5th Annual Memorial Day FF Meet. Site: 21 Rd. P. Neilson CD, 2104 Gunnison Ave., Grand Junction, Colo. 81501. Sponsor: Grand Junction Modelers.

May 31-June 1 — Clarksdale, Miss. (AAA) Clarksdale Climbers 9th Annual Meet for FF & RC. Site: Fletcher Field, Mrs. G. Pickel CD, 1631 Steen Dr., Clarksdale, Miss. 38614.

May 31-June 1 — Madera, Calif. (AA) Fresno Radio Modelers Open RC Contest. Site: Airport, B. Ehme CD, 3668 N. Howard, Fresno, Calif. 93726. Sponsor: Fresno Radio Modelers.

June 1 — Cincinnati, Ohio (AA) Cincinnati AMA CL Meet. Site: Lunken Airport, D. Patton CD, 2493 Downing Dr., Cincinnati, Ohio 45208. Sponsor: Exterminator Combat Team.

June 1 — Granite City, Ill. FAI FF Qualifying Trials. Site: Lakeside Airport, D. Linstrum CD, 12411 Leigh Lane, Maryland Hts., Mo. 63042. Sponsor: Kirkwood Thermalers.

June 1 — Howell, Mich. (AA) Midwest 1st Annual RC Pylon Jambores. Site: Midwest RC Society Field, J. Josatis CD, 23663 Lawrence, Dearborn, Mich. 48128.

June 1 — Chardon, Ohio (AA) CRC 300 All Pylon RC Races. Site: Club Field, E. Vidmar CD, 26800 Zeman Ave., Euclid, Ohio 44132.

June 7-8 — Shreveport, La. (AAA) Louisiana State Model Airplane CL Championships. Site: Hobby Park, W. Lank CD, 111 Witham, Dallas, Tex. 75220.

June 7-8 — Tullahoma, Tenn. FAI FF Qualification Trials. Site: Airfield Flying Field, B. Cleveland CD, 708 Country Club Dr., Tullahoma, Tenn. 37388. Sponsor: Coffee Airfoilers Club.

June 7-8 — Columbia, Md. (AA) 2nd Annual DC/RC Glider Meet. Site: DC RC Field, W. Nesbitt Jr. CD, 1115 Chickasaw Dr., Silver Spring, Md. 20903. Sponsor: DC RC.

June 7-8 — El Monte, Calif. (AA) Contest for RC. Site: Whittier Narrows, J. Garabedian CD, 809 N. 3rd St., Montebello, Calif. 90640. Sponsor: San Gabriel Valley RC.

June 7-8 — Lincoln, Nebr. (AA) Lincoln Sky Knights 10th Annual RC Contest. Site: 33rd & Superior, R. Keenan CD, 7131 Colby, Lincoln, Nebr. 68505.

June 7-8 — Nashville, Tenn. (AAA) Mid-South RC Championships. Site: Edwin Warner Park, R. Reuther CD, 216 Vaughns Gap Road, Nashville, Tenn. 37203. Sponsor: Middle Tenn. RC Society.

June 7-8 — Spencerport, N.Y. (AA) 10th Annual N.Y. State RC Championships. Site: Salmon Creek Park, T. Salvemini CD, 11 Valley Lane, Avon, N.Y. 14414.

June 7-8 — South Bend, Ind. (AA) TVRC RC Meet. Site: Club Field, J. Hoffer CD, 1312 Brummitt Lane, South Bend, Ind. 46615. Sponsor: Tri Valley RC Club.

June 8 — W. Suffield, Conn. (AA) Nor-East Air Races for RC. Site: Peterson Farms, B. Williams

Continued on page 66



## Getting Started in R/C

Continued from page 42D

the ground; have a couple of buddies hold it up by the wingtips, or put it on a wooden box or table. Use a long insulated tuning tool and try to keep as far from the plane as you can. Of course, you've seen many modelers tune the receiver with the plane on the ground, possibly a few feet from the transmitter. And they fly with no problems at all. Fortunately, equipment makers have provided us with excess receiver sensitivity, excess transmitter power, and our flying ranges are relatively short!

R/C equipment instructions always stress that tuning should be checked at a good distance from the transmitter. You will find that tuning is much sharper then, and you can get it right on the nose. It might take only a few degrees of tuning tool to pass the transmitter signal entirely. Close by the transmitter, you could have as much as a half a turn. And the center of that half turn isn't necessarily the correct tuning spot! If you must tune nearby, remove the transmitter antenna, or collapse it fully, to greatly attenuate the transmitter signal.

Loading coils have been used in superhet receiver antennas, and in some cases will provide much better pickup. In other words, you could fly much further from the transmitter. Generally, though, if properly tuned, superhets are amply sensitive for our purposes. Don't bother with a loading coil unless the receiver maker suggests it. Or, unless you want to fly the plane out of sight!

## Balsa Baka Bomb

Continued from page 42

quired, to achieve balance at approximately the point shown on the drawing. Hand-glide your Baka, using a vigorous heave to get the little beast up to flying speed. Add or subtract nose weight, until a smooth descent is obtained. If the model is free from visible warps, yet persists in "falling off on one wing," add a small lump of modeling clay to the opposite wing.

**Catapult:** In lieu of the Betty-bomber which was used to get the real Baka to altitude, we employ a simple catapult, which can be quickly and easily fabricated from a 6" length of 1/4" diameter hardwood dowel, and a loop of 1/8" flat rubber. The catapult launching technique is worthy of some elaboration: First, it is important to recognize that the position by which the model is gripped will alter the launch angle (almost the thrust-line, in effect).

We have obtained entirely different results by gripping the model underneath the wing, rather than by the tail of the fuselage, for example. Also, you may wish to experiment with moving the launching hook slightly forward or aft. While flying under windy conditions, which the Baka doesn't mind, our best results have been achieved by launching across, instead of directly into the wind.

Oh yes, if through some stroke of misfortune, your little Baka happens to bury itself in the ground, you can always tell the onlookers that it was merely a demonstration of a scale landing!



### Z-I-P- Watch it, Mister!

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# Model Rocketeer

NATIONAL ASSOCIATION OF ROCKETRY

1239 Vermont Avenue N.W., Washington, DC 20005



## USAF ACADEMY CONFIRMS NATS SITE

The following letter from Lt. General Thomas S. Moorman, U.S. Air Force Academy superintendent, dated February 7, 1968, is reprinted with pride, for the benefit of NAR members nationwide:

"The USAF Academy will host the Eleventh National Model Rocket Championships. We can provide additional tours and programs to encourage these rocketeers to continue their work in the science and engineering of rockets. We are happy to support your program since activities of this nature tend to insure the continued success of this country's missile and space efforts.

"Captain Harry M. Kepner, in the Department of Astronautics and Computer Science, is the Academy's project officer. He has discussed the program with local representatives of the National Assoc. of Rocketry and the Civil Air Patrol and has begun coordination with Academy officials."

By the way, has your section made every effort to plan launch schedules often, and well enough in advance, to give members the opportunity to earn points needed to qualify for NARAM-11 at the USAF Academy, Colorado Springs, Colo., Aug. 11-15? Though some NAR members may not qualify, sections should encourage everyone to attend to gain knowledge for NARAM-12. Also bear in mind that only through proper support, fine organization, and respect for USAF property coupled with sportsmanship competition, earns a USAFA NARAM site.

## FAA AND MODEL ROCKETRY

With the aerospace sport/hobby of model rocketry becoming increasingly popular to youth, clubs, schools and the serious-minded research person, and noting the fact that more than four million models have been launched without report of a serious accident, NAR members should know that FAA regulations concerned. While it is fine to consider large model projects for reasons of photo work, weather studies, etc., assure yourself in advance that your model will not violate FAA regulations.

PART 101 concerned with balloons and unmanned rockets states: "This part prescribes rules governing the operation of the United States, of the following:

(3) Any unmanned rocket except— (i) Aerial firework displays; and (ii) Model rockets— (a) Using not more than four ounces of propellant; (b) Using a slow-burning propellant; (c) Made of paper, wood, or breakable plastic, containing no substantial metal parts and weighing not more than 16 ounces, including the propellant; and (d) Operated in a manner that does not create a hazard to persons, property, or other aircraft.

Contact your local FAA representative to review Subpart A & C of Part 101 in more depth. At the same time, section officials could ask the FAA chief locally to be a guest speaker for a future meeting. (FAA

has some films their men present at meetings.)

## ROCKETEER SPOTLIGHTS ALASKA SECTION

(Author's note: This is the first in a series of articles designed to acquaint NAR sections with the history, organization and programs of other established sections. In our initial request for information of persons, places and events which shaped the destiny of sections, we also asked researchers to furnish the specific secrets of success in any given part of their program. This first installment was furnished by a section in advance of our request, so full treatment was not possible. However, MR's who think launching in their area is unique may reconsider after checking this one. Does your section have an interesting story to tell? Send it in with photos of activities in section officials.

Alaska's only NAR section at press time, the Anchorage Assoc. of Model Rocketry (AAMR) meets twice monthly for discussions, business and model rocket construction sessions. Recent elections gave Robert Westmoreland the presidency; Jack Pennington became vice president; and Jim Eshenower, secretary-treasurer.

About 100 members attend the meetings at Wendler Junior High School, through the capable assistance of Jim Harpster, school shop instructor. A recent project of the group was construction of a multiple launcher, with most of the parts donated by a local hobby shop, the "Anchorage House of Hobbies." Mounted on a collapsible saw horse, it has spaces for launching eight models.

One of the first model projects by the group involved three members working on one rocket, for training under supervision. A total of six single-stage models was completed in this manner.

President Westmoreland reports one launch, the coldest, was held in temperature of 5 degrees below zero, but that launch sessions are usually held providing the temperature is "not less than 10 degrees above."

## "COULD HAVE KILLED SOMEONE."

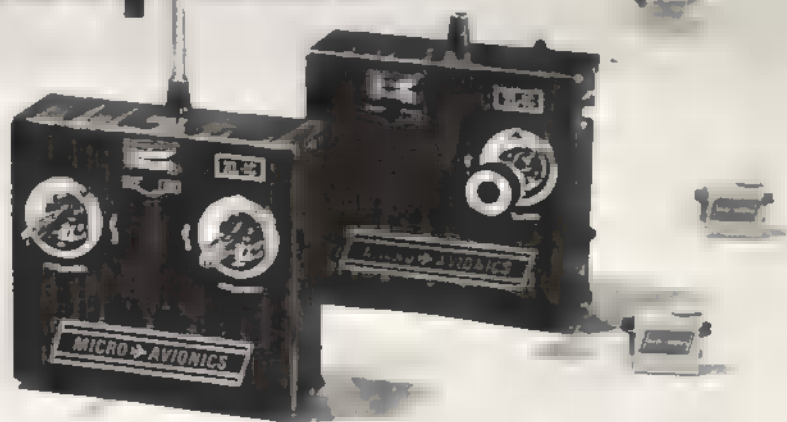
Many letters received at NAR Hdqrs. describing incidents and accidents or potential situations which endanger both NAR members and innocent bystanders. Here's an item from a rocketeer of Miami, Fla., who reports a flagrant violation of range safety (not by a NAR-type) and ordinary leading to possible loss of life:

"About 100 rocketeers and spectators gather every Sunday at an old airport here for a launching session. Recently, we had real trouble with a young, inexperienced flyer who rarely launches with us. What he did could have killed someone, injured someone seriously or done other damage.

"He made what he called a 'dart,' nothing more than a model rocket engine, fins and straw. The engine was a C-6-5 type on one launch he got off without anyone suspect-

Continued on page 70

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# Nakajima Hayabusa Army Type 1 Fighter

The Japanese 'Oscar' was distinguished by a beautiful camouflage pattern which can be faithfully duplicated.

JOHN N. TOWNSLEY

THE model featured this month (Japanese Hayabusa "Oscar," manufacturer's kit #7) is made by Tamiya-Mokei Model Co. of Japan, imported and distributed by Model Rectifier Corp. of Brooklyn, N. Y. MRC has an excellent line of 1/50th-scale WW II model plane kits, as follows: Shinden-Kai "George," Hayabusa "Oscar," Raiden "Jack," Shoki "Tojo," Hien "Tony," Goshikisen, Saiun "Mert" and lastly the #99 "Dive Bomber."

The above kits are available at your hobby shops or you may contact MRC, 5300 21st Ave., Brooklyn, N. Y. 11204.

The "Oscar" was chosen because it is a very good kit; parts are well made, flash-free, etc., and the aircraft has a very beautiful camouflage pattern. The predominant

camouflage colors are silver and medium-pale green with a dash of yellow and matt black. When your model is completed and you stand back and view it critically, you will appreciate the beauty of the model — its grace and unusual camouflage pattern.

This article will be beamed at the model-builders who may recently have acquired an airbrush, or who plan to in the near future.

There are three airbrushes on the market which I have used with excellent results: Binks-Wren, Badger, and Paasche. The Oscar was sprayed with a Type H Paasche which retails at about \$15. This is a very versatile airbrush and is the only Paasche unit which, to my knowledge, handles lacquer, enamels and paints. Extra paint jars for storage of paint may be obtained from Floquil or Badger Airbrush Co.

One of the most expensive items in purchasing spray equipment is the compressor, but there is one reason why you cannot form a modeler's group and either contribute equal shares toward purchase, or have someone buy the unit and rent it out to members of the group in much the same way that a floor polisher is rented out. Do it the "Coin-op" way, let the members pay \$1 or so for the use of equipment for a 24-hour period. Plan ahead — have at least two or more models assembled and ready to spray so that the rental will pay off in usage.

Materials used for the Oscar are as follows: One Tamiya-MRC Oscar kit, one bottle each of the following: Pactra Rainbow Lacquers — tile green, RL #60, silver finish, matt black (ML 10) and Pactra lacquer thinner. Floquil primer, one sheet each of

Continued on page 58



Unless you are modeling a specific aircraft, a random camouflage pattern is correct. Coloring is silver blobs with dark green.

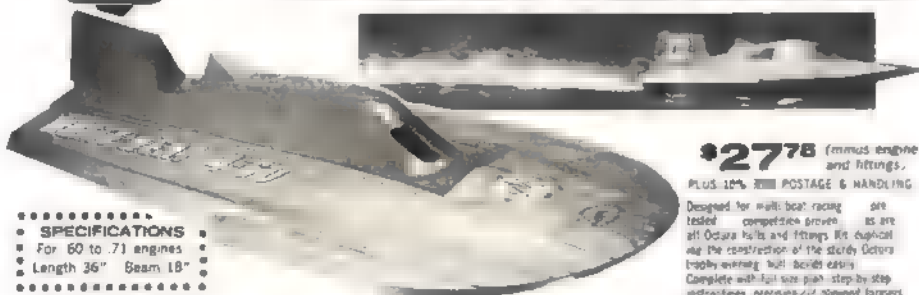


With plane assembled, fill any gaps, spray with primer, then silver and clear. Do all detailing and masking before camouflaging.



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## Radio Control World

Continued from page 35

gory): **WW I or Prior Scale**, Walt Moucha (Jenny); **Post WW I Scale**, Ron Jones (Beech Staggerwing Bipe); **Pattern Plane**, Art Schroeder (Eyeball stunter); **Sport design**, Nick Samardge (Phatal delta); **Pylon**, Joe Holmes (Mustang); **Boats**, F. S. Godby, ("Challenger" schooner); **Best of Show**, F. S. Godby ("Fair American" brig); **Testers Best Finish Award**, Len Sabato (scale Chipmunk). In what was about 90% a model plane show, it might seem unusual that a boat took Best of Show honors: Godby had three R C sailing craft of really fabulous workmanship and detail — the judges had a hard time deciding which one should get the prizes. Congrats to the WRAMS for pulling off a real dinger on their first try — and we share their amazement in the tremendous turnout they enjoyed!

**Dedicated R/Cer gone:** After suffering several serious heart attacks in the past few years, Dr. Bob Lien died on Feb. 1. Despite his problems, Bob refused to stop flying, and had been most active. He was, in fact, flying a new Pylon racer when he suffered his fatal attack. His good friend and fellow-modeler Stan John, who sent me the sad news, notes that Bob was not only a fine person, but probably the most dedicated modeler he had ever met. The New Orleans R C gang will sorely miss their perennial sparkplug!

**Who are you?:** Letter dated Feb. 10, 1969 tells us that the writer built a Wankel model engine from info taken from our article in June '68 issue. A few bugs still to be ironed out. The engine was made of stainless steel (our correspondent says this was a mistake). He wants more information on this type of engine — but the last page of his letter is missing, and we don't know his address or even his name! If the writer will get in touch with us, perhaps we can help.

**The Chicago Scalemasters:** Clark Macomber (922 Oak St., Winnetka, Ill. 60093), apparently an avid scale modeler (he was a scale judge at the '68 Nats), tells of a new model group in his area, the Chicago Scalemasters. Clark will handle public relations. Dave Platt is president. Club was formed to encourage Scale modeling both locally and nationally. While most scale builders in the Chi area are R/Cers, control-line and free-flight scalers will be welcomed.

Monthly meetings are held and anyone with a scale problem (or interest) is urged to attend.

The Valley R C Flyers (Los Angeles area), is setting up a Scale Directory, principally for R/Cers on the West Coast. Californians who are interested in scale should

drop a line to Don Butman (6161 Platt Ave., Woodland Hills, Calif. 91364).

From a letter in this club's paper from Dave Platt, we learn that, as of mid-December, the Chicago Scalemasters had members, was getting 8-10 more a month, and that they hoped to run a Chicago Scalemasters meet, probably in September.

**Latest Duster.** In Prop Wash, paper of the Billings (Mont.) Flying Mustangs, we note that Simon Dreese already has a modification of his Montana Duster (see p. 44, '69 American Aircraft Modeler Annual) ready for Spring. It's called "Duster D." has over 600 in. in. area, is about 1/4 lb. lighter than standard Dusters with equipment. It has full symmetrical airfoil, center-hinged ailerons. Does fine slow rolls ft. off the ground. Simon won club Builder-of-the-Year award at recent club dinner.

**Highest R/C field?:** That's the claim of the Pikes Peak R C Club... no, they don't fly on the top of this 14,210-ft. mountain, but their club field at Colorado Springs is in a valley just to the east of Pikes Peak, at 7200 ft. altitude. They've had the field Mark Wild Ranch for eight years. Also based upon the ranch is the Black Forest Glider Club, owning some 15 gliders and three tow planes. Wonder if this has led the PPRCC boys into the R C glider field?

Among the members of the R C group were two Air Force Cadets, Ron Schreck and Ivan Munninghof (ME-109, May issue — Ed.). Both have been active modelers. Ivan has already graduated and Ron will soon, and both will leave for further training elsewhere. This AMA-chartered club has at least two contests each year — one invitational open fly-in for all hands, and a club meet. These fun-flies are more popular than formal AMA competition.

The boys find flying at their altitude is no great problem — after you learn that a plane sinks much faster in the glide, and will stall quickly with elevator. More engine power is needed, of course. A 36 is needed at the PPRCC field, where a 29 would be used at sea level. Gerald Hayhurst invites all R/Cers who pass by to stop for some flying — many acres of clear land in every direction!

### Competition

**Seventeenth Annual Championships:** Latest in a series of R C meets will be sponsored on June 28-29 by the Detroit R C Club, whose field is near 18 Mile and Mound Roads, north of Detroit. Events will be Pattern for Class A, Class B, Class C Novice and Expert, Open Pylon, Formula I and Formula II Pylon, Scale. \$1500 in merchandise prizes, down to 5th place, plus 1st-place trophies. Further info from Sterling Smith (4865 Pelton Rd., Drayton Plains, Mich. 48020).



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The service experts listed in this advertisement are, for the most part, people who have been working with Digital and other kit systems in the various areas mentioned. They have put together an M.A.N. System from a raw kit and have agreed to stock parts that are compatible with World Engines Systems. They have been given schematics of World Engines Systems and current Digital Proportional systems. Many of these service experts make other makes of equipment besides our equipment. Consider these people for repair work or for help in matching up our flight packs or the coming bricks.



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Kit FS-24 Wing span: 55" Length: 43" For engines: .45 and up

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Kit features brilliantly high gloss red plastic covered foam wing panels, ready to join; assembled ready-to-go factory-built fuselage in which the maple motor mounts, maple nut blocks, birch plywood sides, birch wing saddle, etc., have been factory installed. Two sheets of giant authentic decals; plastic canopy, wing tips and hatch; formed wire gear, Sullivan fuel tank, all required hardware, nylon horns, nylon push rods, etc.

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Kit D-5 Length: 23 3/4" Beam: 2 3/4"

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Built in Scotland in 1869, the Cutty Sark is the most popular and the world's fastest clipper ship of her day. Our Cutty Sark is an heirloom kit, with plans authenticated by Mr. George Campbell, world's foremost naval authority.

Completely carved hull of clean pattern grade pine with the expensive carved-in-place bulwarks. To insure heirloom-permanency, no balsa is used in this kit. All birch masts and yards are beautifully tapered, and the decks have sawed-in planking grooves. Hundreds of cast fittings in perfect scale, single and double blocks, brass chain, authentic details, mahogany display base with mounting pedestals. Step-by-step plans show every "secret" of construction, etc.

**\$25.95**



**Rousing racing regatta:** Big event of the '69 power boat racing season will be the International Model Power Boating Assoc. Regatta, July 27th-Aug. 3rd, at San Diego. To be held in conjunction with San Diego's 200-year celebration, there will be activities available for the entire family. The host club (San Diego Argonauts) is setting aside parts of two days for Scale steam and Electric demonstrations and competition. There will be plenty of races and record trials for the speedsters too. Already many of the top model boatmen from the U.S. and Hawaii have signed up. Full info may be had from: 1969 IMPBA International Regatta (Box 17098, San Diego, Calif. 92117).

### NEW IN R/C

Having heard that **Bonner Specialties** is the business, several modelers have written to ask where they can get their Bonner equipment serviced. If you have Bonner digital, send it to Gordon Larson (2602 S. Artesia, Santa Ana, Calif. 92704). Gordon was one of the originators of the Bonner digital line and understands it fully. He has been designated by Bonner Specialties as the official service station for such equipment. Other Bonner equipment service (reed servos, for example) is still handled from the old address (9522 W. Jefferson Blvd., Culver City, Calif. 90230). We understand that some Bonner parts and components may be had from this address also.

An "extractor" type muffler called **Vac-Pack** is available from **DK Products** (7382 Meadow Ln., Parma, Ohio 44134). Unit is open front and back; airflow helps pull out exhaust gases and aids cooling. However, this one is entirely different in looks from the usual design. Has stack to clamp onto engine exhaust, but muffler body is short and rectangular. Complete unit weighs 8 oz., \$8.95 PP. Intended for 50-61 engines in this range. Maker claims 50% increase in power, with acceptable reduction in noise level.

Two new Adams actuators at recent Toledo Conference. One the familiar Baby size but has 400% higher coil resistance - will draw only around 40-50 ma at 2.4-3V. This AR actuator weighs 61 oz., \$8.45; low resistance coil is sold separately for conversion of original Baby to low draw. The new Baby Twin (has dual magnets) may be had with either low or high resistance coil, offers much greater control surface moving power for only slight weight and size

increase; this one weighs 75 oz. All these little **Spinado** now have built-in movement limit stops and are distributed through **Acc Radio Control** (Box 381, Higginsville, Mo. 64037).

Though they did a good job of kitting their **Kwik-Fly III Top Flite Models Inc.** (2635 S. Wabash, Chicago 16 Ill.) has been surprised to find that many novices and experts have been surprised to find this plan-less (Top Flite spent a lot of time and effort in the prefab designed the kit so that plans are complete) unnecessary for assembly. According to many requests, **Spinado** offers a complete set of full-sized building plans. There is also a new enlarged sheet of assembly sketches and instructions. Owners of the **Kwik-Fly III** kit may want all this material free, by simply clipping the **Spinado** panel from the lower right corner of the original assembly instruction sheet and (be sure to include your name of **Spinado** to Top Flite. You'll also receive a set of **Spinado** diaphragm braces, a beef up the center joint of **Spinado** wings. Remember - don't send money. Do name panel from original instruction, plus your name.

Expanded line of **Spinado** mufflers in a lighter, lower cost design are being marketed by **Model Aircraft Ltd.** (Norwood Pl., Bournemouth, England). There are two sizes, **Spinado** engine capacities from 18 to 24, but a variety of adapters **Spinado** that there will be a tight fit on **Spinado** different **Spinado** makes of engines. All the engines which these mufflers are made **Spinado** manufactured or widely distributed in the U.S. The larger muffler **Spinado** about 2 1/2 oz. the smaller **Spinado** 2 oz. All are clamped to the cylinder with a threaded **Spinado** pair of vibration-proof locknuts. Prices in England **Spinado** \$5.10 for large **Spinado** \$4.35 for small. Maker **Spinado** to have outlet in U.S. by the time you read this; prices over 100% higher.

A twin-opposed cylinder glow engine built in Europe is being imported by **Krank Mfg. Co.** (W. Julian St., San Jose, Calif. 95110). Presently available only in air-cooled version **Spinado** 61 displacement, larger **Spinado** smaller sizes will later be stocked. There also **Spinado** be water-cooled types. Concern is presently designing an ARF plane especially for the **Spinado**. It will have foam wings and P.G. fuselage. The engine runs best with props from 11-8 to 12-6, speed range is 2,000-14,000 rpm. Equipped with R-C throttle. Crankshaft is ball-bearing. Price of \$90 includes a pair of mufflers, with latter in **Spinado** no exhaust baffles are needed for good idling.

R-C glider types who visited the Toledo Conference were intrigued by the fuselage of a scale "Cirrus" model shown **Spinado** **Mr. Fred Miltky** Chief Engineer of the German **Johannes Graupner** concern. This model is a close scale copy of the present world-champion full-sized glider. Model will span about

120", and is some 58" long. Vacuum-formed fuselage comes in three sections in the kit. It is of tough ABS plastic that will not change length significantly with temperature changes. Designed for rudder, elevator, ailerons. Wings normal built-up construction, has a "flying stab." Provisions for mounting small engine in pod over wing. While this sleek craft can be flown on rudder-only, undoubtedly you'll need REA for best results. Kit price is not known yet, but kit will be distributed in the U.S., possibly through Nelson Model Products Inc. (Box 2027, Dublin, Calif. 94566). Should be available in July.

Several new plans and kits offered by **Bob Holman** (Box 741, San Bernardino, Calif. 92402). There is a **Junco** 2-sheet plan from the **Complete A-Pac English line**; 59", span, for 48-61 engines. From **Spinado** line comes a 1 1/2" scale P-47D; 81", span plane in kit form costs \$43.95, or plans only for \$4.50. From Bob's own line is a two-sheet plan for the English "Currie Wolf" single-place sport biplane, with about 44 1/2" span. Plans show full-house controls. ST **Spinado** engine is suggested for scale performance; plans, \$3. Bob also has added a semi-scale 49" P-51-D kit to his line, for \$29.95 PP. The present **Complete A-Pac** kit for the **Tiger Moth** is a land plane (costs **Spinado** PP); but a separate kit for floats soon will be offered.

Giant scale **Piper J3 Cub** offered in kit form by **Agan Aero Products** (Box 63, Norwalk, Conn.). This 8' span plane is intended for full-house controls, designed for use with 60-80 engines, said to feature easy construction. Kit includes formed ABS plastic cowling, seats and dash. Plane is scaled 2 1/4" to 1", should be ideal for glider towing. Plans are on two 30 x 60" sheets.

Latest R-C car from **The Testor Corp.** (Rockford, Ill. 61101) is a **Fastback Mustang 2-2, 15"** long. Comes with propo steering and provision for start-stop. Car has steel chassis, nylon gears, two electric motors and heavy-duty rechargeable batteries. Complete with radio equipment and charger, costs \$89.95. Similar radio equipment used in Testor ready-to-fly plane, this has 44" span wing, 049 engine with patented starter; pulse propo rudder control. Complete plane outfit is same price. The radio gear includes eight-transistor relayless pulse transmitter with center-loaded antenna, 12V battery and 250 mw input. Pistol lever gives steering and there is a trim control, also provision for start-stop button for car use. Super-het receiver plus dual-magnet Adams-type actuator and nickel-cad pack weigh 6 oz.; system comes all wired and with switch and charging connector on small separate panel, radio system with charger, \$79.95. The **McCos** line of R-C engines now includes four sizes - .39 to .40 cu. in. capacity. All are throttle-equipped, of course, prices range from \$14.95 to 17.95.







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Three planes now in the line by Hares (290 Thompson Ave., Oceanside, N.Y. 11572). The 67" span Javelin for 45-60 engines is the oldest, is rated as an ABC trainer, costs \$44.95. Fury is a stunter for the expert, for 60 engines only, 63" span, same kit price. Coming soon is full-scale model of the Waco Meteor; kit has large formed canopy, plane will have simulated wing-tip tanks, trike LG. and **is** fully assemble. All kits have countless pre-cut parts for fuselage, foam wing cores, all balsa sheeting and hardware.

The 2" to 1" line of WW I scale plane plans from Aero Tee Model Eng. Co. 178 Condit St., Harrison, N.Y. 10523, now includes Spad XIII, Fokker DR I, Albatross DV-A, Emden E-III. Plans are \$7.95 for all but the latter (which is \$6.95). Rib and former kits are available for all models, at prices ranging from \$15.95 to \$26.95; these kits do not include the plans. The planes have been seen in action at many scale events. flown by Lou Perrett.

## Scale Techniques

Continued from page 53

#400 and #600 wet or dry. Jeweler's file. Another very useful item is a Lazy Susan; these can be obtained in many supermarkets or the five-and-ten stores, sometimes under a dollar in cost. They are excellent for using to spray the model—when the model is placed on the revolving Lazy Susan, you will not need to handle the model while spraying. In addition, Duratite tile putty, auto spot putty, small bottle Wilhold cement, Testors liquid cement, **a** fresh roll of masking tape 3/4" or wider and curved cuticle scissors.

Check kit for any missing or broken parts repairing as needed. Sometimes there is a long wait for parts to be sent from manufacturers. Have not yet had to send to MRC for any parts, but from past experience know that the waiting period is true of some manufacturers—so I always advise checking of parts so that you will not have the model partly built only to discover some part is missing. I will buy a kit if the box tape has been broken, but not if the sealed bags containing parts have been tampered with. A dealer has no way of knowing whether you lost the part yourself, or loss occurred in the store.

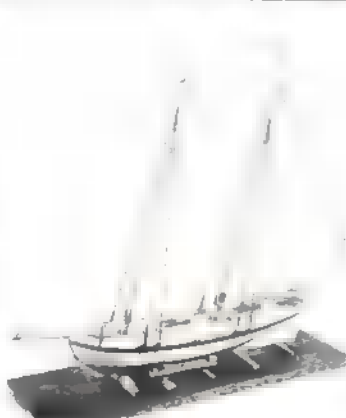
Assemble the kit as per directions. Make flaps and ailerons movable if you wish; the canopy **as** well **can** be made to slide back and forth. I made all my parts static, however, **as** they are not handled anyway.

After the parts are assembled, use spot putty very sparingly where seams may have opened up or are not a tight fit. Always use a very small amount of putty as you may destroy some of the surface detail—rivets, panel lines, etc. If you have to sand around the rivets, roll your sandpaper into a tight tapered roll. Use the tip to pick the putty out without sanding off the rivets.

Apply primer coats until model has a smooth finish, sanding between coats. After final sanding of primer coat, then on to the business of spray-painting the model. (See Photo). Silver is tricky to handle, but is well worth the trouble, compared to using the paste products such as "Rub-N-Buff" or "RUB-ON." Of course, if you have no access to spray equipment, or do not know anyone who will spray the model for you, then you will have to use either of these or **a** similar product. Of these two, RUB-ON gives the best finish.

In mixing the Pactra silver, mix with Pactra thinner, testing on scrap plastic until you have the proper mixture. It should not be so thin it runs nor too thick either; the correct mix is about the consistency of coffee cream. There is one thing you must remember about silver or any metallic finish: the metallic powder, being heavier, will settle to the bottom of the spray container. Consequently, you will have to stir it well at least once every five minutes when spraying. Wooden coffee stirrers are excellent for this purpose.

Spray entire plane with one coat of silver.



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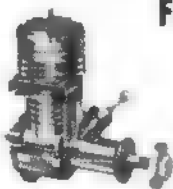
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allow to dry thoroughly. Then sand lightly any spots that are rough. Again, watch the rivets and detail. Stir the silver thoroughly before you start to spray the second coat. At the end of the second spraying, your plane should begin to look like aluminum; however, if you think another coat would improve the plane by all means do spray again, being sure to stir the silver mixture thoroughly before you spray.

Allow the model to dry completely before starting the camouflage pattern. In the meantime, clean your ■ thoroughly with thinner. Then mix Pactra clear with Pactra thinner until the mixture is ■ thin as water. Test ■ on a piece of scrap plastic; be sure the mix is not ■ thin that it will ■. Cut the pressure down to about 20 lbs. and place your plane on Lazy Susan ■ suitable holding device. Coat hanger will make a good holder. Place with top side of plane down. Spray all undersurfaces with the

clear mixture. As soon as you ■ handle without smudging, put it right side up and spray upper surfaces with clear. Repeat this process about four times. You will be amazed at the depth that has been achieved on the aluminum-sprayed surface by the addition of the clear coats. The reflection seen in the photo is due to the depth created by spraying with clear.

While the clear spray is drying, you can prepare your camouflage pattern thusly: On ■ piece of Formica or plastic, unroll about four lengths of masking tape. What you will ultimately require is about six pieces which are cut to 12" or so, give or take a silly little millimeter. If more lengths ■ needed, use the same process to cut more. Draw assorted shapes on plastic with ■ soft lead pencil (check photos for approximate size, shape and placement as to where tape will be applied).

After you have penciled in the various

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#A691, **EAA Biplane** — Nick Zirol's flying-scale, R/C model uses a ■ engine and full-house multi gear. It has constant-chord, 38" span wings with ■ semisymmetrical foil and a box and stringer type of fuselage. Two sheets. **Price — \$2.50**

#A692, **Miracle Worker** — build John Blum's control-line trainer; learn how to fly four competition events: combat (fast and slow), carrier and stunt. Easy-to-build profile model has just one wing planform. Use ■ .35 size engine. **Price — \$1.50**

#A694, **Montana Duster** — a R/C Class C stunt model by Simon Drees that has a semi-scale appearance. Foam wings and a simplified structure cut assembly time to 6 hrs. A two-sheet plan shows ■ low-cost usage of sheet balsa. **Price \$3**

#A696, **New Englander** — George Murphy's functional and dependable 1/2A Free-Flight model for competition. NACA 6409 wing airfoil gives rapid climb with a floating glide. It's a good design for the flyer eager to try contests. **Price — \$1.50**

#A693, **Sweeper** — Windy Urtnow-sky's giant, control-line stunt model has a 78" span and flies nicely with a .60 up front. Though large, this competition design is practical and highly developed with many trim adjustment features. **Price — \$2.50**

#A695, **Lady Maxley** — Brian Donn's A.2 Nordic towline glider has seen much contest flying and development. Wing has a Davis 3 airfoil with a Ritz-type of construction. Form the balsa tube fuselage with a pool cue. **Price — \$1.50**

#A697, **Dwarf Dip III** — easy-to-fly, rubber-powered Coupe de Hiver design by Charles Sotich is a winner! Great fun for smallish fields, the high-performance model has a warp-resisting structure with an efficient configuration. **Price — \$1.50**

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shapes, take a #11 X-acto blade, fit it in the X-acto holder, or use a single-edge razor blade, which has been taped with masking tape along about 3/4ths of the cutting edge. This will protect your fingers when you ■ engrossed in cutting out the intricate camouflage pattern. Use the cuticle scissors to make smoother curves than you will be able to get with the X-acto or razor blade. A word of explanation: please remember that the pattern of masking tape which you will apply from your cutouts will remain silver on the finished model. The other areas will be green. On the model shown in the article, I wanted the camouflage to be predominately silver. If you prefer that the green be the more prominent of the two, then make your camouflage pattern half the size, i.e.: trim away the patterns to the size you prefer.

I will explain the method I used to apply the cutout camouflage pattern. After the shape was trimmed to my satisfaction, I applied ■ to the model. As each piece was cut, I applied it. One on the wing tip, one on fuselage side, ■ here, there, and everywhere, until I was satisfied with it. It looks like a jigsaw puzzle cutout when you get through with it. If you feel that some of the masking tape has resulted in a pattern you do not like, remove with tweezers and either reposition them or trim them down. After final pattern is on plane, do some other part of the plane, or some other task — anything else — and then reinspect your camouflage pattern. You will find that you will be able to look at your handiwork far more objectively than before.

Mask off and spray the anti-glare panel black; then after dry, remask so that when you ■ spray the green the panel will remain black. Next, mask off the edges of both wings and spray yellow. After yellow has dried, remask well so that the green will not seep through the masking tape.

Paint the cockpit flat black and mask off ■ that no green will be sprayed on the cockpit. Paint tires with "Tire Color" (Official Paints has an excellent ready-mixed paint for this purpose and their exhaust stack paint is also very effective).

Mask and spray yellow stripes on each landing gear cover. Propeller blades are flat black all over and the spinner is reddish-brown.

Now to spray the camouflage green. Your paint must be ■ thin ■ you can get it and still be able to handle. If you check photos, you will ■ that there is no buildup of green paint around the patches of masking tape where they meet the silver painted areas. Be very careful and spray the paint on very lightly. Don't try to cover with the green in one spraying as this is almost impossible to do without ruining your paint



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job. My model required three sprayings before the right coverage had been reached. Each spraying was done with the lightest touch, as I intended only to barely tint the silver with the green.

Black car tape was used on the wind tunnel and canopy. One thing was done a little differently. After the black car tape was in place, I painted over the black tape with the green paint, using a soft brush. This gives a very finished effect.

At this point the patches can be pulled off. For safety first, keep the pieces of tape cutouts in case you would have to do a section over again. It would be impossible to duplicate the curlicues on another cutout. As you remove each cutout, check to see that paint has not seeped under tape. Put each removed cutout back on the plastic.

You should have a beautiful plane at this stage, and you now take off the masking tape from the anti-glare panel, the tape applied to the landing gear covers, and leading edge of both wings.

Cut the decals as close to the color as possible; soak and apply and your plane is ready for display in your "Museum in Miniature."

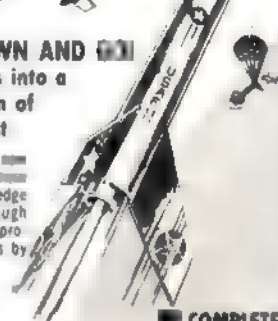
## THE MAIL BAG

Spacecraft recently played an important part both on the newsfront and the plastic kit front. Latest package from Monogram contained the 1/144 scale Apollo PS-193 Saturn Rocket Kit (priced at \$19.95 retail). This is a very complete kit in every respect. The illustrated brochure describing it is most educational.



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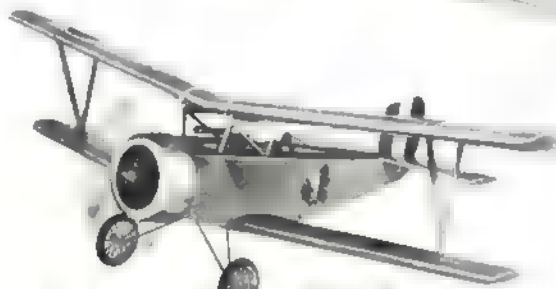


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All three stages of the rocket are contained in the kit. The main feature is that the separate rocket stages can be assembled and disassembled. This allows for a good breakdown of the actual spacecraft itself and illustrates its various separations in flight. Kit parts are white plastic with clean castings and are nicely finished and with excellent instructions for assembly. This is an excellent kit for classroom study.

Revell's Apollo kit also is excellent; the unit members being the main difference. This is the Apollo Lunar Spacecraft H-1838, also selling for \$19.95. Only the last stage of the rocket assembly is included; the kit is in 1/48 scale.

Both kits actually are on a par — including excellence of parts and assembly, and the Revell illustrated brochure, although treated a bit differently, is equally informative.

The Revell kit is made of five detailed sections: the command module, service module (Launch Escape Tower is detachable), lunar module (with folding legs) nests within the Apollo-Saturn Adapter Section during flight. Three Astronaut figures for the Command Module are included as are two display bases. Entire unit is over 20" high when assembled.

Also, in the space line, Revell has the following comparatively new kits: 1/48 scale Apollo Spacecraft; 1/24 Gemini Spacecraft; X-15 Rocket Plane; 1/48 Mercury Capsule with Atlas Booster, and Mercury Capsule with Redstone Booster.

Following are updated re-issues from Revell kits contain new decals, new artwork: A-5A Vigilante, H-134 at \$1; Convair F-102 Delta Dagger, H-130 for \$1; Douglas X-15 Silhouette, H-135 for \$1; Martin B-57B Intruder (British design, Viet Nam color scheme and decals) H-132 for \$1; Saab J-35 Dragon — 1/72 scale Swedish jet fighter, H-131 for \$1; LTV A-7D Corsair II, 1/72 scale Fighter-Bomber, H-133 for \$1; Mercury Gemini, H-1834 for \$1.30 in 1/48 scale; Boeing SST Supersonic Clipper — two 18" scale models in each box, with Pan American markings.

Lindberg has the first American plastic kit of the G4M-2 Mitsubishi Japanese Bomber "Betty." The kit is in 1/72 scale, No. 578 for \$1. This aircraft saw action in every theater operations in the Pacific during WWII. Named "Betty" by the Allies, it scored major successes early in the war. But it was vulnerable to air land attack due to the heavy armament installed which made it such an easy target. The final mission for two of these bombers was the transportation of the Japanese surrender team. That epitomizes the Mini Bag for this month; something here will appeal to almost every reader.

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## B.O.M. Rule

Continued from page 50

of the model and should be allowed under the interpretation.

4. Based on the initial determination of the judge, one of the following questions might be asked of the contestant about his model, and the flyer should be expected to answer without prompting from anyone.

q — Is the model a kit, a modification of a kit or an original? Briefly explain in your own words.

q — What changes or modifications did you make? Briefly explain them.

■ — How is the wing constructed, covered, finished?

q — How are the control horns installed?  
■ — How is the cowl removed? What is it made of? How did you make it?

Actually there are many questions that could be asked, but a qualified judge should be able to support or change his initial determination with only a few. Of course he should be aware that the modeler might not use proper terminology, and he may have to re-phrase his question occasionally, but the contestant should be able to explain in simple words or ELSE he or she should be disqualified.

5. This item would be the most automatic of all, and should be one of the first considerations. The Judge should check the modelers AMA license number on his or her card and on the airplane. They should match, and they should be permanent type numbers: i.e., paint, decal, doped tissue numbers etc. Marker pen and masking tape type numbers should not be acceptable. Also, apparent paint over a number tampering evidence on card or airplane should be highly suspected, and the Judge should get, and expect, an explanation, or else disqualify the contestant.

Joe further says:

I do understand that such decisions for disqualification can be unpopular. Contestants caught cheating won't like it at all and will raise a stink. The honest contestants will like it, and you can bet on that. A good aid to this at the initial stage is that Contest Directors provide signs stating the builder of the model rule, and also require that the contestant sign a statement at each event on his score sheet to the effect that "I have built the model(s) I am flying in this event according to rule 1.17"; both sign if team entry is indicated. In practice this does work; I have initiated the practice at my contests, and I shall continue to do so.

Contestants so disqualified should be able to protest immediately to the CD or event director. I suggest that he or she be given a signed statement by the disqualifying judge and a copy be retained for the record of the Contest Director — that is if the contestant states that he or she wants the statement. In any event, the reason and determination should be written on the contestant's score sheet and be signed by the judge; i.e., contestant Joe Blow, AMA #000000, is disqualified — explanation of wing construction indicates he did not fully comply with rule 1.17. Signed I. B. Judge, AMA 00000, date, time, event and contest sanction number.

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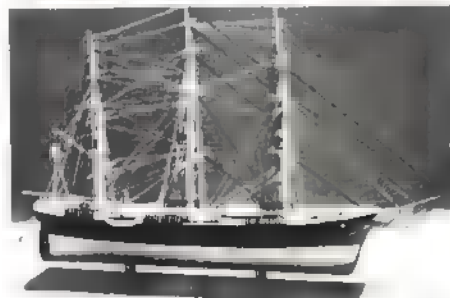
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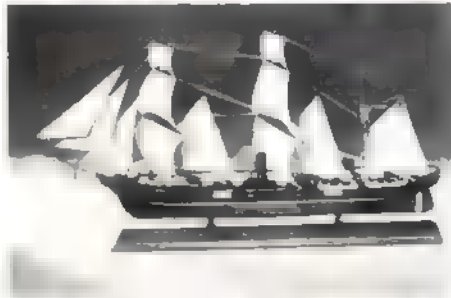
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June 8 - Colorado Springs, Colo. Pikes Peak 5th Annual Fun Fly. Site: Black Forest Glider Port. Hayhurst CD. 1218 Oswego, Colorado Springs, Colo. Sponsor: Pikes Peak RC Club.

June 8 - Queens, N. Y. (AA) Luftmeister Custom Tailored Navy Carrier Profile Meet. Site: Flushing Meadow Park (Pending). S. Condon II CD. c o 131-30 233 St. Laurelton N. Y. 11413.

June 8 - Sioux Falls, S. D. (AA) Annual Spring FF Meet. Spec. Jr. Event 12 yrs. & under. Niederl CD. 901 S. Glendale Ave., Sioux Falls, S. D. 57104.

June 8 - Great Southwest, Tex. FAI FF Qualifying Trials. Site: Country Rd. & Chapel Rd. W. McCord CD. 4612 Pleasant St., Ft. Worth, Tex. 76115. Sponsor: Ft. Worth Planesmen.

June 8 - Valley Park, Mo. (AAA) Greater St. Louis Modeling Assn. Annual CL & RC Contest. Site: Buder Park Model Airplane Field. Johnson CD. 6328 Jackson, Berkeley, Mo. 63134.

June 8 - Sacramento, Calif. (AA) No. Calif. FF Council Meet. Site: Jackson. Sunrise Ave. J Pond CD. 2162 43rd Ave., San Francisco, Calif. 94116. Sponsor: San Francisco Vultures.

June 13-15 - Pensacola, Fla. (AAA) Fiesta Five Flags 11th Annual South Eastern Model Championships for FF, CL & RC. RC & CL Site: Corry Field. FF Site: T. McLaughlin CD. 4140 Fern Ct., Pensacola, Fla.

June 13-15 - Asheville, N. C. (AA) RC NC 15th Annual RC Institutional. Site: Asheville-Hendersonville Airport. B. Johnson CD. 4139 Sheridan Rd., Greensboro, N. C.

June 14-15 - Ft. Worth, Tex. (AA) Ft. Worth Thunderbirds RC Club Meet. Site: West Shore, Benbrook Lake. R. Lutker CD. 3103 Cockrell Ave., Ft. Worth, Tex. 76109.

June 14-15 - Nedrow, N. Y. Syracuse RC Flying Jamboree E 120 CD. 3950 Highland Ave., Skaneateles, N. Y. 13152. Sponsor: Syracuse AHCUS.

June 15 - Cleveland, Ohio (AAA) Cleveland Sport 20th Annual CL Meet. Site: Cleveland Flying A. Montagino CD. 3911 Daisy Ave., Cleveland, Ohio.

June 15 - Grandview, Mo. (AAA) 2nd Annual Kansas City Regional CL Championships. Site: Richards-Gebaur AFB. B. Wright CD. 2818 Collin, Independence, Mo. 64052. Sponsor: Sky Devils MAC.

June 15 - Ft. Lewis, Wash. (AA) 1st Annual Puget Sound FF Contest. Spec. OT events. Site: Ares 30. B. Site CD. Ave. S.W., Puyallup, Wash. 98971. Sponsor: Puget Sound FF Club.

June 15 - Taft, Calif. (AA) Old Timer Gas 30 Sec. Antique Meet. Site: Gardner Field. G. Wallock CD. 220 LeRoy Ave., Arcadia, Calif. 91008. Sponsor: SCAMPS.

June 15 - Richmond, Va. Brainbusters FAI FF Qualification Trials. Site: Curles Neck Farm, F. CD. 113 Peach Tree Lane, Hampton, Va. 23669. Sponsor: Brainbusters.

June 15 - Davenport, Iowa (AA) 12th Annual CL Meet. Site: Airport. R. Norgard CD. 2324 W. 29th St., Davenport, Iowa 52804.

June 15 - York, Pa. (AA) York Line Tamers Annual Round Up for CL. Site: Caterpillar Tractor Co. F. Skelly CD. 2237 W. Market St., York, Pa. 17404. Sponsor: York Line Tamers.

June 15 - Forest Preserve, Ill. (AA) Skylarks 2nd Annual RC Meet. Site: Rt. 53 Higgins Rd., H. Brokhor CD. 410 Nash Rd., Crystal Lake, Ill. 60014. Sponsor: Skylarks.

June 15 - Hawthorne, Mass. (AA) NMAA Annual Meet. Athletic Field. R. Gaertner CD. 9 Brookbridge W. Peabody, Mass. 01960. Sponsor: Northshore Model Aircraft Assn.

June 15 - Moundsville, W. Va. IFO Fun Fly for RC. Site: Fair Grounds. S. Sturm CD. Box 5234, Vienna, W. 26101. Sponsor: Valley IFO MAC.

June 15 - Haskell, Tex. (AA) Annual Sun Puli FF Contest. Site: Haskell Airport. C. Frierson CD. Box CD. Haskell, Tex. 79521. Sponsor: Dallas Cloud Climbers.

June 15 - Deer Lake, Pa. (AA) Tri County Wing Snappers 7th Annual RC Meet. Site: Airport. S. Stover II CD. 210 Washington St., Schuylkill Haven, 17972. Sponsor: Tri County Wing Snappers, Inc.

June 15 - St. Charles, Mo. 1 1/2 Hour Pre-planned RC Flying Demonstration. Air Field. Restricted. R. Williams CD. Bondurante Dr., Bridgeton, Mo. Sponsor: Spirits of St. Louis RC Club.

June 21-22 - Davenport, Iowa (AA) Davenport RC Society Contest. Scott County Park. H. Pohl CD. Ohio, Davenport, Iowa 52802.

June 21-22 - Ft. Worth, Tex. (AAA) Eastside Lions Club CL Annual. Boaz Model Field. B. Davis CD. 1613 Carl, Ft. Worth, Tex. 76103.

June 21-22 - Creve Coeur, Mo. (AA) Spirits of St. Louis Annual RC Contest. Site: Spirits Field. W. Butters CD. 2565 Bradwell, Florissant, Mo. Sponsor: Spirits of St. Louis RC Club.

June 21-22 - Dayton, Ohio (AAA) Wright Brothers Memorial Annual RC Meet. Site: Wright Patterson AFB. D. Lowe CD. Clar-Von Dr., Dayton, Ohio 45430. Sponsor: Western Ohio Radio Kontrol Soc.

June 21-23 - Wallops Station, Va. (AA) Mid Atlantic Radio Kontrol Society RC Meet. H. Jones CD. 59 Aigburth Ave., Towson, Md. 21204. Sponsor: Mid Atlantic Radio Kontrol Society.

June 21-22 - Denver, Colo. (AA) 11th Annual Mile Hi RC Meet. Site: Lowry AFB. W. Kessler CD. 4765 E. Denver, Colo. 80222. Sponsor: Mile Hi RC.



June 21-22 — S. C. (AAA) S. C. State Championships for RC. Site: 1-85 between Greenville & Spartanburg. L. Johnston CD, 382 Church St. -E-3, Smyrna, Ga. 30080. Sponsor: Western Carolina RC Club.

June 22 — St. Clair Shores, Mich. (AA) St. Clair Shores Modelers 15th Annual CL Meet. Site: 14 Mile Rd. & Harper. T. Craft CD. Rosemont, Roseville, Mich. 48066.

June 22 — Green Bay, Wis. Summer Jamboree for Special RC Events. Site: Austin Straubel Field. R. Cowles CD, 2424 Ducharme Lane, Green Bay, Wis. 54301. Sponsor: Green Bay RUF.

June 22 — Hastings, Minn. Minneapolis FAI Qualifications for PF. Site: Webers Flying Field. D. Monson CD, 131 W. Wentworth Ave., W. St. Paul, Minn. 55118. Sponsor: Minneapolis Model Aero Club.

June 22 — Orchard Park, N. Y. Flying Knights 5th Annual RC Fun-Fly. Site: Airport. N. McCormack CD, 8708 Hillcroft Dr., Bostin, N. Y. Sponsor: Flying Knights of Hamburg.

June 22 — Bristol, Conn. (AA) Hornets Model Classic for CL. Site: Edgewood School. J. Scott Jr. CD, 285 Witches Rock Rd., Bristol, Conn. 06010. Sponsor: Hornets MAC.

June 22 — St. Marys, Pa. 3rd Annual Fly-for-Fun for RC. Site: Club Field, West Creek Rd. J. Florio CD, 123 Fourth St., St. Marys, Pa. 15857. Sponsor: St. Marys Area RC Society.

June 22 — Odessa, Tex. Odessa-Midland 13th Annual FP Contest. Site: Prop Buster Park, Ector Airport. L. Hood CD, P. O. Box 6822, Odessa, Tex. 79760. Sponsor: Prop Busters of Odessa.

June 22 — Council Bluffs, Ia. (AA) Annual Midwestern Model Airplane CL Meet. Site: Iowa School for Deaf. J. Dreier CD, Ave. B., Council Bluffs, Ia. 51501. Sponsor: Balsa Busters.

June 22 — Pittstown, N. J. Rockaway Valley RC Club 2nd Annual Novice Meet. Contact for rules. Site: Sky Manor Airport. A. Schroeder CD, Spenser Rd., Glen Ridge, N. J. 07028. Sponsor: Rockaway Valley RC Club.

June 28-29 — Tulsa, Okla. FAI FP Qualifications. Site: TGD Field. B. Hanford CD, 3838 S. Ave., Tulsa, Okla. 74145. Sponsor: Tulsa Glue Dabbers.

June 28-29 — Hempstead, L. I., N. Y. (AA) 5th Annual RC Meet. Site: Mitchell Field. R. Geyer CD, 913 Washington St., Baldwin, N. Y. Sponsor: Meroke Radio Club.

June 28-29 — Wichita, Kans. (AAA) Annual Midwestern Championships for FP, CL & RC. Wichita Modelers Council Field, 13th & Webb Rd. J. Finley CD, 5217 E. Murdock, Wichita, Kans. Sponsors: Wichita Hawks & Wichita RC.

June 28-29 — Richmond, Va. (AA) 9th Annual RC. Site: Oliveville Field. G. Gregory CD, 12709 Richmond St., Chester, Va. 23831. Sponsor: Richmond Area RC.

June 28-29 — Detroit, Mich. (AA) 17th Annual Great Lakes RC Meet. Site: Mile & Mound Rd. T. Brett CD, 18804 Millar Rd., Mt. Clemens, Mich. 48043. Sponsor: RC Club of Detroit.

June 28-29 — Greenville, Miss. (AAA) Mississippi Model Airplane Champs for FP, CL & RC. Site: Municipal Airport. J. McLehian CD, 12 Woodlawn, Yazoo City, Miss. 39154.

June 28-29 — Kansas City, Mo. (AA) KC Annual RC Contest. Site: Lake Jacomo. Drummond CD, 9115 Charlotte, Kansas City, Mo. 64131. Sponsor: Kansas City RC Club.

June 29 — Irving, Tex. FAI FP Qualification Trials. Site: New S.W. Airport. W. Wilker CD, Boston, Irving, Tex. Sponsor: Dallas Cloud Climbers.

June 29 — Granite City, Ill. FAI FP Qualifying Trials. Site: Lakeside Airport. Linstrum CD, 12411 Leigh Lane, Maryland Hts., Mo. 63042. Sponsor: Kirkwood Thermalers.

June 29 — Cortland, Ohio Trumbull Co. RC Fun Fly. Site: Thomas Farm. Waterman CD, 2821 Red Fox Run Dr. N.W., Warren, Ohio. Sponsor: Trumbull Co. RC Club.

June 29 — Fresno, Calif. (A) Fresno Monthly FP Meet. Site: Near Kerman. F. Gallo CD, 1725 Keamore Dr. W., Fresno, Calif. 93703. Sponsor: Fresno Gas Model Club.

June 29 — Lincoln Park, N. J. (AA) East Coast Scale Championships for CL. Site: Aldrome E. Dickson CD, 36 Vreeland Ave., Clifton, N. J. 07011. Sponsor: Garden State Circle Burners.

June 29 — St. Paul, Minn. (AAA) 10,000 Lakes CL Championships. Site: State Fair Grounds. R. Kampmann CD, 18525 26th Ave. No., Watzata, 55391. Sponsor: Minneapolis Pison Poppers.

June 29 — Arlington, Tex. 2nd Annual Golden Triangle RC Clubs WW I Contest. Site: North Lake Flying Site. D. Downing CD, 403 Monroe, Arlington, Tex. 76010.

June 29 — Odessa, Tex. (AA) Odessa-Midland 13th Annual CL Contest. Site: Ector Airport. L. Hood CD, P. O. Box 6822, Odessa, Tex. Sponsor: Prop Busters of Odessa.

June 29 — Rockford, Ill. (AAA) Rockford Annual Contest for CL. Site: Riverdale School Playground. W. Luhman CD, 4429 Virginia Ave., Rockford, Ill. 61103. Sponsor: Rockford Aeromodelers.

June 29 — Lowry AFB, Colo. (AA) Sky Dusters 7th Annual CL Contest. Site: South of Hangar. Haynes Jr. CD, 3065 Jackson St., Denver, Colo.

June 29 — Columbus, Ohio (AA) Northland CL Championships. Site: Northland Shopping Center. C. Hemmerly CD, Sandusky Blvd., Columbus, Ohio. Sponsor: Capital City Controllers.

July 4 — Mentor, Ohio (AA) MARCS All Pylon Day. Site: Club Field — Grass. F. Vidmar CD, 355 Zeman Ave., Euclid, Ohio 44132.

July 4-5 — Tullahoma, Tenn. (A) U-Control Meet.

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July 1-6 - Tulsa, Okla. (AAA) Tulsa Glue Dobber 20th Annual Meet for FF. Ind. CL RC. Site: TGD Field. W. Salmikov CD. 9906 S. Yale, Tulsa, 74135. Sponsor: Tulsa Glue Dobbers.

July 3-6 - Frederick, Md. DCRS Mirth of July Spec. Events Meet. Rules available on request. Site: Municipal Airport. M. CD. 2001 Norvale Rd., Silver Spring, 20906. Sponsor: DC RC Club.

July 5-8 - San Jose, Calif. (AA) Wavemasters Contest. Site: Club Flying Site. R. Morse. Pruneridge, Santa Clara, Calif. Sponsor: San Jose Wavemasters RC Club.

July 5-6 - Nehring, Fla. (AAA) Nats for FF & CL. J. Wagner CD. 274 E. 9th St., Hialeah, Fla. 33010.

July 6 - Urbana, Ill. (AA) C-U Aeronauts 7th Annual CL Meet. Site: Illini Airport. Pasimpaur CD. 310 E. Benham St., Tolono, Ill. Sponsor: Champaign-Urbana Aeronauts.

July 6 - Hufield, Conn. (AA) Nor-East Air Races '89 for RC. Site: NCRCC Model Air Park. G. Sawu CD. 6 Audrey Lane, Thompsonville, Conn. 06082. Sponsor: Northern Conn. RC.

July 6 - Queens, N.Y. (AA) Luftmeister "Modified CL Stunt & Flying Scale Meet. Site: Flushing Meadows Park (Pending). P. Bianchini CD. c/o 131-20 22 St., Laurelton, N.Y. 11413.

July 12-13 - Oklahoma City, Okla. (AAA) Sooner State Model Aviation Championships for FF & CL. Site: North Western Memorial. F. Miller CD. 1900 Holling Ridge, Bethany, Okla.

July 12-13 - Hamersville, S.C. SC Lowland Fly Site: CRCS Flying Field. J. Bradham CD. 10 Hawthorne St., Sumter, S.C. 29105. Sponsor: Charleston RC Society.

July 12-13 - Albuquerque, N.M. SWAT FF Qualifying Trials. Site: Boy's Academy. C. Averdi CD. 2314 Palomas N.E., Albuquerque, N.M. 87110. Sponsor: South West Aero Team.

July 13 - Richmond, Va. Brainbusters FAI FF Qualifying Trials. Site: Curles Neck Farm. D. Orr CD. 102 Hickfield Dr., Hampton, Va. 23366. Sponsor: Brainbusters.

July 13 - Fountain Valley, Calif. (A) Rubber & Glider Site: Mile Square. G. Wallock CD. 220 44th Ave., Arcadia, Calif. 91006. Sponsor: Thermal Thumbers.

July 13 - Hastings, Minn. (AA) Minneapolis MAC Annual Summer FF Meet. Site: Webers Flying Field. D. Monson CD. 131 W. Wentworth Ave., W. St. Paul, Minn. 55118. Sponsor: Minneapolis Model Aero Club.

July 13 - Hastings, Minn. Mpls Qualifications. Site: Webers Flying Field. D. Monson CD. 131 W. Wentworth Ave., W. St. Paul, Minn. Sponsor: Minneapolis Model Aero Club.

July 14-20 - Willow Grove, Pa. (AAAA) 1989 National Model Airplane Championships. Site: Naval Air Station. See June issue AAM for details.

July 19-20 - Tacoma, Wash. (AA) Mount Rainier RC Society WW I Contest. Site: Bethel School Dist. Location: B. CD. 811 9th Ave. Puyallup, Wash. 98371. Sponsor: Mt. RC Society.

July 20 - Denver, Colo. (A) MMM Monthly Outdoor FF. Site: Prop Busters Field. M. McShee CD. 1260 S. Denver, Colo. Sponsor: Mag-nificent Mountain Men.

July 25-27 - Sunnyvale, Calif. Memorial Contest. Site: Pioneer Field. J. Sunday CD. 6657 Rainbow Dr., San Jose, Calif. 95129. Sponsor: Pioneer RC Club.

July 26-27 - Tahlequah, Okla. (AA) 2nd Annual Tahlequah Cup RC Races. Site: Municipal Airport. J. Wingo CD. 2615 Elgin, Muskogee, Okla. 74401.

July 27 - Fresno, Calif. (A) Fresno Monthly FF Meet. Site: Near Kerman. P. Gallo CD. 1726 Kermore Dr., W. Fresno, Calif. 93703. Sponsor: Fresno Gas Club.

July 27 - Irving, Tex. FAI FF Qualifying Trials. Site: New S. Airport. B. Wilder CD. 2010 Boston, Irving, Tex. 75060. Sponsor: Dallas Cloud Climbers.

July 27 - Chicago, Ill. (AA) 4th Annual Aero Angels Model CL Meet. Site: Irving & Cumberland. H. Hardi CD. Lincoln Ave., Lincolnwood, Ill. Sponsor: Chicago Aero Angels, Inc.

July 27 - Dayton, Ohio. Midwestern CL Championships & FAI CL Selection Meet. Site: Municipal Model Flying Field. M. China CD. 5028 Broughton Pl., Dayton, Ohio 45431. Sponsor: Dayton Buzzin Buzzards.

July 27 - Dayton, Ohio (AA) Midwestern CL Championships. Site: Municipal Model Flying Field. C. China CD. Broughton Pl., Dayton, Ohio 45431. Sponsor: Dayton Buzzin Buzzards.

July 27-Aug. 2 - Rockford, Ill. EAA Delta Dart Program. Site: Greater Rockford Airport. J. Gresh CD. 255 Grand Blvd., Bedford, Ohio 44014.

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- Aileron linkage is pre-assembled ready for installation.
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If you win 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st, 32nd, 33rd, 34th, 35th, 36th, 37th, 38th, 39th, 40th, 41st, 42nd, 43rd, 44th, 45th, 46th, 47th, 48th, 49th, 50th, 51st, 52nd, 53rd, 54th, 55th, 56th, 57th, 58th, 59th, 60th, 61st, 62nd, 63rd, 64th, 65th, 66th, 67th, 68th, 69th, 70th, 71st, 72nd, 73rd, 74th, 75th, 76th, 77th, 78th, 79th, 80th, 81st, 82nd, 83rd, 84th, 85th, 86th, 87th, 88th, 89th, 90th, 91st, 92nd, 93rd, 94th, 95th, 96th, 97th, 98th, 99th, 100th.

Class	Expense	Class	Expense
1st	\$1000	1st	\$100
2nd	500	2nd	50
3rd	100	3rd	25
4th	50	4th	10
5th	25	5th	5

## \*Assemble in 5-12 hrs.

1. Glue pre-cut wing halves together.
2. Mount tail surfaces.
3. Attach control surfaces.
4. Install engine and equipment (not included).

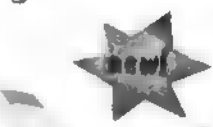
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## Ultimate Models

Continued from page 27

of getting data from a balance, we as many as 2,500 pressure tubes. These pressure tubes are stainless steel, usually with an inside diameter of .033 inches. These are installed to have the open ends flush with the external surfaces of the model, on wings, fuselage, tail, pylon-nacelle, etc. For example, on a wing, tubes are installed in approximately 15 rows, spaced equally from the wing tip to the center of the model. There are approximately 25 tubes in each row on both upper and lower surfaces.

Tubes will transmit a pressure to a "Scanivalve" unit mounted in the model. These Scanivalves are connected to transducers which change the pressure reading to an electrical impulse, which is read out on electronic equipment. Data from these pressures determine how much force is exerted on each component of the model, as well as its distribution. When plotted this data shows how much load is exerted on each square-inch of wing. This enables designers to know how strong each piece of structure must be. It is an eternal struggle with designers to solve the old strength-to-weight problem. Over the life span of the airplane pound of weight savings can be worth \$200.00 because of extra payload that can be carried. You can see this is worth nearly its weight in gold. If every component on a plane were made twice as heavy as required, it would be a problem to even takeoff empty of cargo.

**Flutter models:** Flutter models are built more nearly like model airplanes we commonly know them. Usually, they are constructed of balsa wood and covered with Silkspar. We haven't been able to improve

on the old balsa and paper method where models must be strong, yet light.

Very accurately machined aluminum beams are installed in wing, tail, fuselage, pylon-nacelle, and cargo doors. The wing, fuselage, pylon-nacelle etc. are sliced apart every few inches, leaving only the beams holding everything together. Each section is separated by about a 1/16 in. gap and filled with soft foam rubber so as to restrict bending. These models are tested in wind tunnels to simulate all possible flight conditions that will be experienced by the big bird.

Movie cameras (128 frames sec.) are used to record all the deflections the model shows, which can be startling. For example, the C-5A wing will deflect 17 feet up and 12 feet down, for a total of 29 feet under 100% design load. Airplanes by nature must be elastic to absorb all turbulence experienced and forgive hard landings. The C-5A can carry up to 318,000 pounds of fuel. When the wing tanks are full each wing tip will droop down 1/2 inches while sitting on the ramp. The wing is built with negative dihedral to allow flight maneuvers to be accomplished with reduced size control surfaces. When takeoff is accomplished the wing lift actually "unbends" the wing to the designed angle of negative dihedral.

Flutter models show up that may need, for example, thicker skin or heavier structure to suppress possible flutter tendencies. They also can show the way to reducing unnecessary weight.

**Flow visualization models:** Smoke-tunnel and visual-reference models are usually small and not as complicated as the other models. Their testing is done much more economically, however. By blowing smoke over a model or model component, such as a wing section, at various angles of attack,

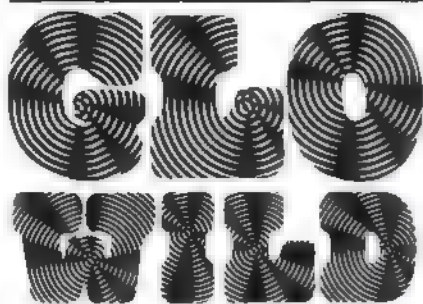
visual reference is given to airflow pattern. Air, or any gas sometimes behaves in an unpredictable manner when flowing around a solid object which appears to be streamlined to the eye. Other visual reference can be obtained by utilizing light oil on the surface, which flows in the direction of airflow. Also, tufts may be installed on external surfaces to observe areas of laminar flow, and areas which show separation and need to be cleaned up.

Lockheed at Marietta, Ga. now is operating the largest privately owned wind tunnel of its type in the world. With this tunnel a whole family of VTOL and STOL airplanes can be investigated. The electric motor generates 9,000 hp and spins a 39-ft.-diameter six-bladed fan. The tunnel is of the single-return type. It has two test sections arranged in tandem. The larger section is 30 feet high, 26 feet wide, and 63 feet long. It is used to test VTOL, STOL, and conventional models at very low speeds, from below 10 knots to 100 knots. This enables good data to be achieved without undesirable flow distortion caused by tunnel walls.

The second test section is 16 feet high, 23 feet wide, and 43 feet long. It will house large models, or even a full-scale JetStar-size wing with flaps and control surfaces. The speed capability here is between 50 and 220 knots. Both these test sections can be utilized with simultaneous testing. Specialized instrumentation and a tremendous air supply are available to enable testing of many different types of models.

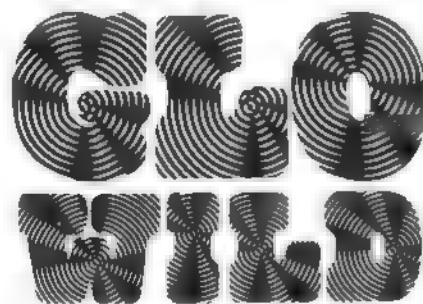
Airplanes are constantly changing and improving. On the proposed commercial version of the C-5A, the Lockheed model L-500 will carry up to 844 passengers. This should reduce direct operating cost to the

Continued on page 76



**HOBBOPOXY Fluorescent GLO-PAINT ORANGE** — another "first" from Hobbypoxy — true fluorescent epoxy paint! Formulated just for model use, **GLO-PAINT ORANGE** is a high visibility finish designed to go on over a base coat of white. As with all fluorescent paints, **GLO-PAINT ORANGE** is transparent (it's the only way they can be made).

Just the thing for stripes, wingtips, tail surfaces, or any other spot where you want to know which end is up. Or down. **GLO-PAINT ORANGE** is mixed and applied just like all the Hobbypoxy colors. And, of course, it's hot fuel-proof, non-shrinking, tough, strong, light and easy to use.



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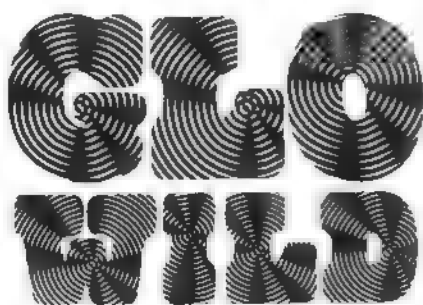
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## Model Rocketeer

Continued from page 51

ing — it had no fins and carried 'boulder'-size marble aloft. We later discovered the dart was launched without a straw.

"It did not hit anyone when the ejection charge fired the marble downward at great speed, but a spectator's Javelin suffered a dent. The dart-maker wasted no time disappearing, while we rocketeers faced a not-too-happy owner. We offered to pay for the damage but the gentleman finally said he would take care of it personally.

"Because of this serious incident and the fact that the wild engine or marble could have hit someone — especially in the eyes — our group immediately set down mandatory safety rules to be followed by all rocketeers, including pre-launch model inspections.

"Please publish this letter for the sake of other rocketeers."

### FIRST PERMANENT RANGE SITE?

(This info. presented by courtesy of The Tracker, newsletter of the Southland Assoc. of Rocketry/NAR Section, Los Angeles, Calif.)

Model rocket launchings may soon be legal within the city of Los Angeles. If this does materialize it will be a result of efforts begun in late 1967 to incorporate model rocketry into the aeromodeling activities already taking place at the L.A. Model Airport near Van Nuys.

The prospective site is the Sepulveda Flood Control Basin, used by modelers for the past 20 years. As part of a \$75,000 proposal to the city Parks and Recreation Dept., modelers would have a permanent flying area within L.A.

A \$5,000 model rocket facility would be included in the package to be completed in the next few years. This would be perhaps

the first permanent and locally subsidized model rocket site in the U.S.

Recently, the Southland NAR Section was invited to join in a demonstration of model aviation for the benefit of city officials, to acquaint them with the safety and educational value of model rocketry. Various types of vehicles were flown by our members.

If all goes well, Southland and other active groups in the L.A. area will be able to legally launch model rockets without traveling inconvenient distances to a site. California is finally recognizing the true value of model rocketry. We hope progress will continue towards that end.

(Any other NAR section working on a permanent site? — Author.)

### CSAR IS ACTIVE SECTION IN OHIO

When citizens of Columbus observed Don Eisele Day, several CSAR (Columbus Society for the Advancement of Rocketry) members participated. George Pantalos, CSAR chairman, and member Joe Baxter presented Astronaut Eisele with a club membership and scale model Saturn 1B.

CSAR also announced a Midwest Regional Meet June 28-29 in preparation for NARAM-11. Events are Parachute Duration, Spot Landing, Boost/Glide, PeeWee Payload, Scale Altitude, and Egglofting. Write: 1131 Shanley Dr., Columbus, Ohio, for info.

### SHORT BURSTS FROM THE PAD

Bob Mullane, president of NAR's Pascack Valley Section in Harrison, N.J., called attention to a mistake in the Rocketeer column, March '69, when we mentioned NARHAMS' (Lanham, Md.) Jim Barrow — as a PVS member. So the editor hereby agrees to haul all equipment to the NARHAMS range and tear it down after some future launch, to make up any recent loss of section progress. . . . Xaverian High





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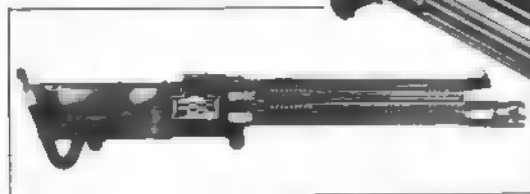
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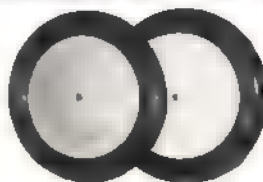
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School Model Rocketry Society's Vol. 1, No. 1 issue *The Xaverian Newsletter* joins the list of section publications launched in January-March. TXN's single sheet format is easily read, neatly done. Kudos to James Bratcher, president of the Brooklyn, N.Y. NAR section, and Ihor Jadliekyj, vp. and Richard Malecki, sec. (NAR members note:

It is NAR policy, as with most non-profit organizations, to refrain from publicizing individual model rocket manufacturers, in this space. However, if you need the address of any MR manufacturers, write NAR Hdqrs.)

Larry Loos.

### Section Calendar

May 4 & 25: June 1 ■ 29; and July 13—Fairchester, Conn. contests.  
June 8—CONN-1 Area Meet (Conn. State NAR members). Events: Scale, Sparrow B.G. Class 1 P.D., and Open Spot Land-

ing.  
June 22—SPQR-3 Regional Meet (Conn., R.I., Mass., N.Y., N.J. ■ Pa.). Events: Plastic Model, Super Scale, Scale, Drag Race, Swift B.G. & Class 2 P.D.

July 27—Regional Meet SPQR-4 (same states). Events: Quadrathlon, R&D. (Note: For CONN-1, SPQR-3 & 4 Meets, contact: G. Harry Stine, Contest Director; 127 Bickford Lane, New Canaan, Conn. 06840).

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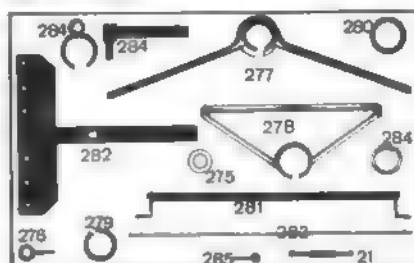
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## Atom

Continued from page 23

wing through the slot in the fuselage and check for a free fit. Apply a liberal amount of glue to the area between those two lines and slide the wing into the fuselage until ■ line appears at each side of the fuselage. With a triangle or carpenter's square, check the leading edge and the bottom wing surface, making sure they are perpendicular to the fuselage. Block the fuselage up with a couple of books so the wing will not touch anything until the glue hardens. The stab can be glued ■ by laying it flat on a table near the edge. Place ■ small piece of scrap ■ ■ ■ ■ ■ balsa at the edge for ■ shim. Then invert the fuselage and glue it down on the stab, again checking it is perpendicular. Add the rudder and dorsal fin to complete the basic structure.

Since this plane is ■ trainer, don't waste



time on a finish. A couple of 4-oz. jars of dope will be sufficient. I used two coats of clear, a coat of sanding sealer (lightly sanded), and two coats of color dope. A small piece of trim and decals complete the job.

Add the hardware. The leadouts can be made from either stranded wire in the Perfect package or solid  $\frac{1}{32}$ " diameter music wire. If stranded wire is used, the looped ends will have to be wrapped and soldered. For the solid wire, merely bend the loop and twist the wire around itself a few turns. This is sufficient. Attach the leadouts to the bellcrank and place the "L" end of the pushrod in the outer hole and bolt on the bellcrank. Fish the leadouts through the holes in the wing tip guide and then make the outer loops.

The control horn is installed on the underside of the elevator. A nylon horn with a backup plate should be used. Tighten the screws up sufficiently to bring the plates snug against the wood. Avoid over-tightening; it will compress the wood. Add a dab of glue to the ends of the screws to keep them from working loose. A plastic pushrod keeper is the best of retaining the pushrod on the horn. This also will allow for the easy adjustment of control later. For the first flights, the pushrod should be placed in the outer hole.

The landing gear is made from a piece of  $\frac{1}{32}$ " diameter music wire. This can be bent fairly easily to the shapes on the plan with a little muscle-power and a good set of pliers. Either metal or nylon clips can be used to fasten the wire to the fuselage. The wheels are held on by using either wheel collars, or by soldering small washers. The fuel tank retainers are made from left over leadout wire. Bend these to a "C" shape and insert through the fuselage, then bend up the tabs on the other side. The fuel tank is fastened by small rubber bands. Place a small piece of cloth or foam rubber under the tank to absorb shock. Bolt on the engine and construction is complete.

**Flying:** The advice presented in the "Small Fry" article applies to this trainer. The best advice is to seek the help of an experienced modeler. If possible, join one of the many clubs throughout the country. If you choose to do it alone, you should expect problems on your first few flights. It is important not to be discouraged if you have a couple of mishaps on your first attempts.

The first thing to do before even going on the flying field is to "break-in" your engine. You must know how to run and start your engine before flying is attempted. Use an engine test-stand or your plane for this break-in period. Fill the tank, then turn the needle valve in all the way till it stops. Then open the needle valve six turns and squirt a couple of drops of fuel into the exhaust. Turn the propeller over a couple of times and then connect the battery and flip the prop smartly. If the engine fires and stops, repeat the priming in the exhaust and flip again until the engine starts and continues running. The engine should be running extremely rich at this point. If it hogs down and stops, turn the needle valve in a turn and restart. Adjust the engine to run steady and rich when the battery clip is removed, and run at least a quart of fuel through it for the break-in. During this "home" break-in period you can learn how to start and adjust your engine.

For the first flights, pick a day when there are not gale-force winds blowing; but there does not have to be a dead calm either. The addition of small ailerons will aid in flying in windy weather. Glue on small pieces (1 x 3") of  $\frac{1}{8}$ " balsa at the ends of the trailing edges. Glue the aileron on the right wing  $\frac{1}{4}$ " up and the left wing  $\frac{1}{4}$ " down.

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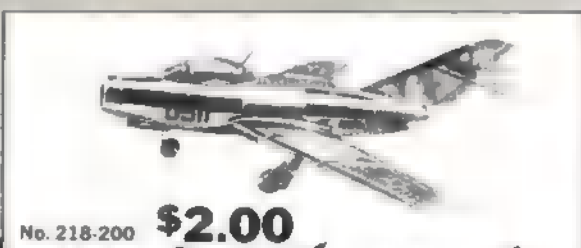


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centrate on just keeping the plane level  
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mastered level flight, you progress to the  
basic control-line flight maneuvers -  
the inside and outside loops and inverted  
flight. You now your way becoming  
an accomplished pilot!

## Miracle at Le Mans

Continued from page 18

from the front horizontal elevators to the  
vertical rudders in the tail, which the frame  
supported. Skids beneath the front eleva-  
tors served as the landing gear.

Next to the engine, along the leading edge  
of the lower wing, was a small bench-like  
seat. There was just room for the pilot  
and a passenger. For show, the Wrights had  
upholstered the seat with vermillion velvet.  
French aviators jokingly referred to it as  
"la amour settee."

The controls consisted of two vertical  
levers and a rudder bar. In this respect,  
the machine differed greatly from the Kitty  
Hawk airplane, because the operator could  
sit upright, instead of lying in a prone po-  
sition on the wing. The plane weighed  
about 1200 pounds.

It was a strange, completely new "vessel  
of the air" so far the observers were  
concerned, even to those who had seen  
the French machines, and to the French  
flyers themselves. They could not get used  
to its having no wheels. The twin-screw  
arrangement was a novelty. Yet, somehow,  
it looked more practical, like a real  
flying machine than did the other designs.  
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There was one observer, however, who  
didn't think so. Oddly, he was M. Ernest  
Archdeacon, the wealthy sportsman, who  
had put up part of the 50,000-franc prize for  
the first 500-meter flight won by Henri  
Farman the past January. Archdeacon,  
who fancied himself a real authority on  
aeronautics - and perhaps he was, for the  
period - entertained a group of people in  
the grandstand including some reporters  
with loud, derogatory remarks about the  
Wright machine.

"It is simply designed all wrong," he de-  
clared. "Positively, the thing will never  
fly!"

He was explaining why, when suddenly  
there was a strange hush that came over  
the crowd, a stillness of anticipation. Wil-  
bur, dressed casually in a gray suit and  
wearing only a cap with a visor pulled  
down low over his face to keep out the  
sun, and a pair of goggles, was climbing  
into the machine and testing its controls.  
The wind had died down. The big moment  
had arrived.

It was 3:10 p.m., Saturday, Aug. 8, 1908, a  
day to remember. With Wilbur at the con-  
trols, the French mechanic and Fleury,  
M. Bollee's chauffeur, each taking hold of  
one of the big blades gave it a downward  
pull and the props started spinning faster  
and faster, fanning up a man-made hurri-  
cane. The engine spat and sputtered and  
coughed, but finally burst out with a  
throaty roar.

Wilbur seemed satisfied, adjusted the  
goggles and his cap. Then he gave a wave  
of his hand to the crowd. The next in-  
stant he tripped the trigger which released  
the weight in the tower. When the weight  
dropped, the plane moved forward along  
the track with Fleury holding onto one  
wing to help keep it level. After running  
alongside for about 40 feet he could not



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keep up with it and let go. The machine began to lift itself free before it came to the end of the monorail. In the next second it was climbing gracefully like a giant bird. ■ continued to elevate steadily until it had reached an altitude of about ■ feet. Then, it leveled off and flew straight and level away from the crowd, heading for the trees at the far end of the race course.

The crowd ■ stunned, silent with awed fascination, too flabbergasted to cheer. There was a great gasp as the machine seemed inevitably to be heading for a crash into the tall trees. But Wilbur banked sharply and the man-made bird made a quick turn, headed back in level flight, roaring past the grandstand at a speed of about ■ miles per hour. At the other end of the oval it made another 180-degree turn, came back directly over the heads of the spectators this time. Twice ■ circled the track. Then, with the sureness and the smoothness of a great gull it glided down to a perfect landing right in front of the grandstand.

The flight lasted one minute and ■ seconds. But in that minute and a fraction, history was made. The crowd went wild.

Spectators surged forward, mobbed Wilbur, trying to give him the French accolade by kissing him ■ the cheeks. M. Bollee and M. Berg, who were first to reach him, and the gendarmes were swallowed up in the wave and frenzy.

Heartiest and warmest congratulations of all came from the French aviators.

"Cet homme a conquis l'air!" shouted Delagrangé, who was almost crazy with excitement, jumping up and down. "Il n'est pas bluffeur!"

"The man has conquered the air! He is not a bluffer!" he shouted again and again. The crowd began to chant the words.

Bleriot rushed out and hugged Wilbur. There were tears in his eyes when he said "C'est bien, ce grande, manifique! The machine is ■ every respect superior to any of ours. A miracle."

Later, ■ shed, when they ■ putting the plane away, Henri Farman approached Wilbur, in confidence, and asked when he could buy a machine from the Wrights. He didn't mention the \$5,000 challenge or the flying contest.

The ■ morning, Paris newspapers ■ screaming headlines proclaimed: "THE MIRACLE AT LE MANS!"

■ Henri Deutsch de la Meurthe, the multi-millionaire oilman, who had been holding out with the syndicate, telegraphed he would take 100,000 francs ■ stock. There ■ no trouble now forming Le Compagnie Generale de Navigation Aerienne. The only question was: how soon could they start building Wright airplanes?

Wilbur, despite wild celebrations and parties which were held after the flight, spent the night in the shed and "slept like a baby next to the miracle machine," according to Le Journal. The next day, Sunday, he attended church and spent the afternoon with the Bergs. The Wrights ■ flew ■ the Sabbath. But bright and early Monday morning, he was making preparations for another flight. He wanted to get in ■ much practice ■ possible. That day he made two flights. As ■ added thrill, he did a figure eight for the crowd. And he made three complete circles of the field!

The next day, August 11, he was in the ■ for three minutes and ■ seconds, and he increased the altitude to above 50 feet. On the 12th, he doubled the altitude again and stayed aloft for more than six minutes.

Thursday, the 13th, his luck ■ out. But ■ before he made seven wide and graceful

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figure eights, which newspapers later acclaimed as the "greatest aerial spectacle ever seen." He was about to make another "eight" when something happened.

The plane was flying at about 75 feet high. He was affecting a sweeping bank when, suddenly, the right wing began to speed up in its tilt and the craft began a slow cart-wheel. He tried desperately to correct it, but before he could level off completely, the other wing tip dug into the ground and the plane ground-looped to a jarring stop. The left wing was completely demolished. Fortunately, he walked away from the crash without a scratch. But it took a week to make the necessary repairs.

During the period the plane was being repaired, Wilbur received word from the French Military authorities that they would be honored to have him use the more desirable field at Auvours. The artillery tests were *finis*. Wilbur was equally delighted. In fact, the shed at Hunaudieres was torn down and reconstructed overnight at the new location.

The plane was placed on an improvised two-wheeled trailer and towed to the new location behind Leon Bollee's automobile. Since the two fields were only about ten miles apart, Wilbur could easily have flown the machine from Hunaudieres to Auvours. He decided against it until he had a chance to familiarize himself more with the controls. Within a few days, he was flying much greater distances as a matter of routine.

He flew for the first time at Auvours just before dusk in the evening of September 4th. The wind, he recorded, was like "a breeze, blowing at about six meters per second," and the machine behaved beautifully. The next morning he flew for 19 minutes, 48 seconds, the longest flight yet, and the flight was made in a ten-mile-an-

hour wind with perfect control and stability. He also attained a speed of almost 40 miles per hour which was the fastest he had flown so far. In landing, he made the same mistake he had made in the fatal turn on the 13th at Hunaudieres. But this time he corrected it in time and although the landing was fast and extremely rough, the plane suffered only a broken skid.

That night, he was overjoyed when M. Berg called to tell him a cable from America said Orville Wright had flown successfully at Fort Myer, Virginia where he was demonstrating another machine for the U.S. Army. Orville, Berg said, was the hero of the hour. America was waking up. The airplane was front-page news across the U.S.

Wilbur, of course, was the most popular figure in France. Everywhere he went people cheered and mobbed him for his autograph. Every word he said was quoted in the newspapers. He was guest of honor in dinners and banquets which somehow he managed to squeeze in, between flights. Indeed, he had won the hearts of all Frenchmen.

## Ultimate Models

Continued from page 69

neighborhood of one-half cent per passenger mile. This will enable lowering of air fares and make flying much more attractive for our ever increasing world population.

About the author: George Perryman has been a model aircraft builder and a competition flyer for nearly 30 years. He captained the U.S. Wakefield team to the 1951 Internationals in Finland, and was a member of the A/2 Nordic teams to Yugoslavia in 1953 and to Denmark in 1954.

Two sons, Steve and Greg, are also active in model competition and have flown several Nats events. Their trophy total is near the 100 mark!

## Rivets

Continued from page 19

Fin area was reduced, stab area enlarged, CG moved forward and VOILA! the aerodynamic problem was identified and solved. Careful inspection showed it to be a binding linkage at the actuator! In such ways are we humbled. Embarrassing as the experience was, it is mentioned only to serve as a reminder that attention to "obvious" details can and do spell the difference between success and failure.

Now a word here about the guidance system. As space and weight are limited, a small package is a definite must and the Adams Baby Actuator is coupled with Ace Radio Control's Commander DE superhet receiver which is designed for actuator use with the "add-on-switcher" built into the circuit. The small size and weight plus excellent range and sensitivity make this a winning pulse proportional combo at a bargain price. Two 225 mah nickel-cadmium button cells and a small switch complete the works at an all up weight of about 2 1/2 ounces.

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Trim and Flying: It is important to re-

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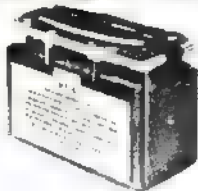
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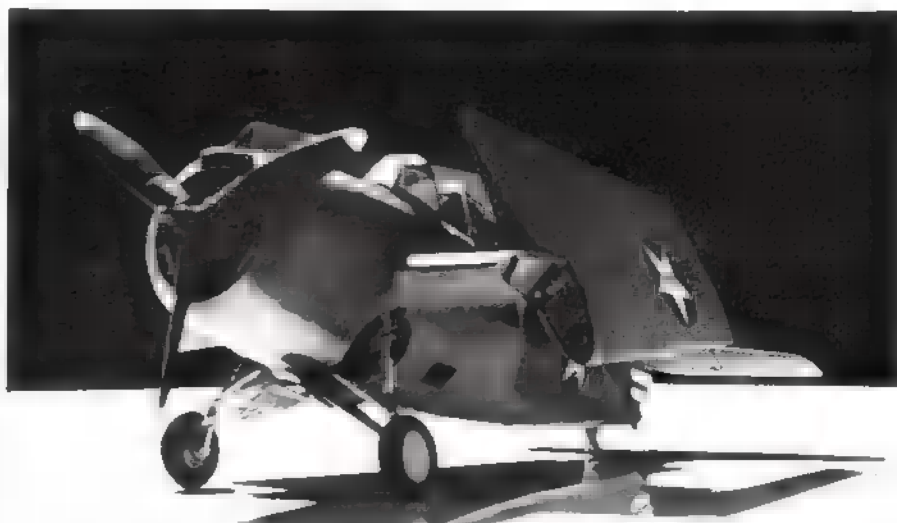
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member that all small airplanes are subject to *scale effect*. To simplify, this means that wing loadings of 10-15 ounces per square foot on a wee-one are the equivalent of a 20-30 lb. loading on a five or six foot model. The exact ratio is not important here but the principle is. With limited area a wing must fly faster to create lift, with the result that there is less speed spread between power on and power off. Because of this, trim and balance are more critical. The little ones are less forgiving. Rivets is no exception.

You will find that the stabilizer trim has a positive effect on performance and small changes of the CG balance point do likewise. Regarding the latter — because of the wing taper, the CG as shown on the plans must be measured balancing the plane at the wing roots — not the tips. It's easier to measure with the ship held upside down. A forward CG will give you a noticeable tracking flight with less noticeable stabilizer trim effect — while a forward CG will produce an opposite effect. The force arrangement shown on the plans gives a fast grooving flight but not for loops — be sure you have plenty of altitude before holding the nose down, for recovery takes lots of air space. A final comment on landings. Set up the approach and leave it alone! Major last corrections will only dump lift and the plane will. As mentioned, when properly trimmed, the glide is fast and flat — if you don't disturb it.

While the foregoing comments may seem on the negative side, they are not intended as such. A scale model such as Rivets has been designed to do certain things well at the expense of limitations which should be respected. This is just common sense. A trainer is not. An exciting performer is. To put it another way —

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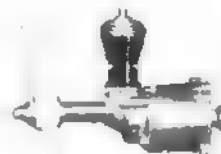


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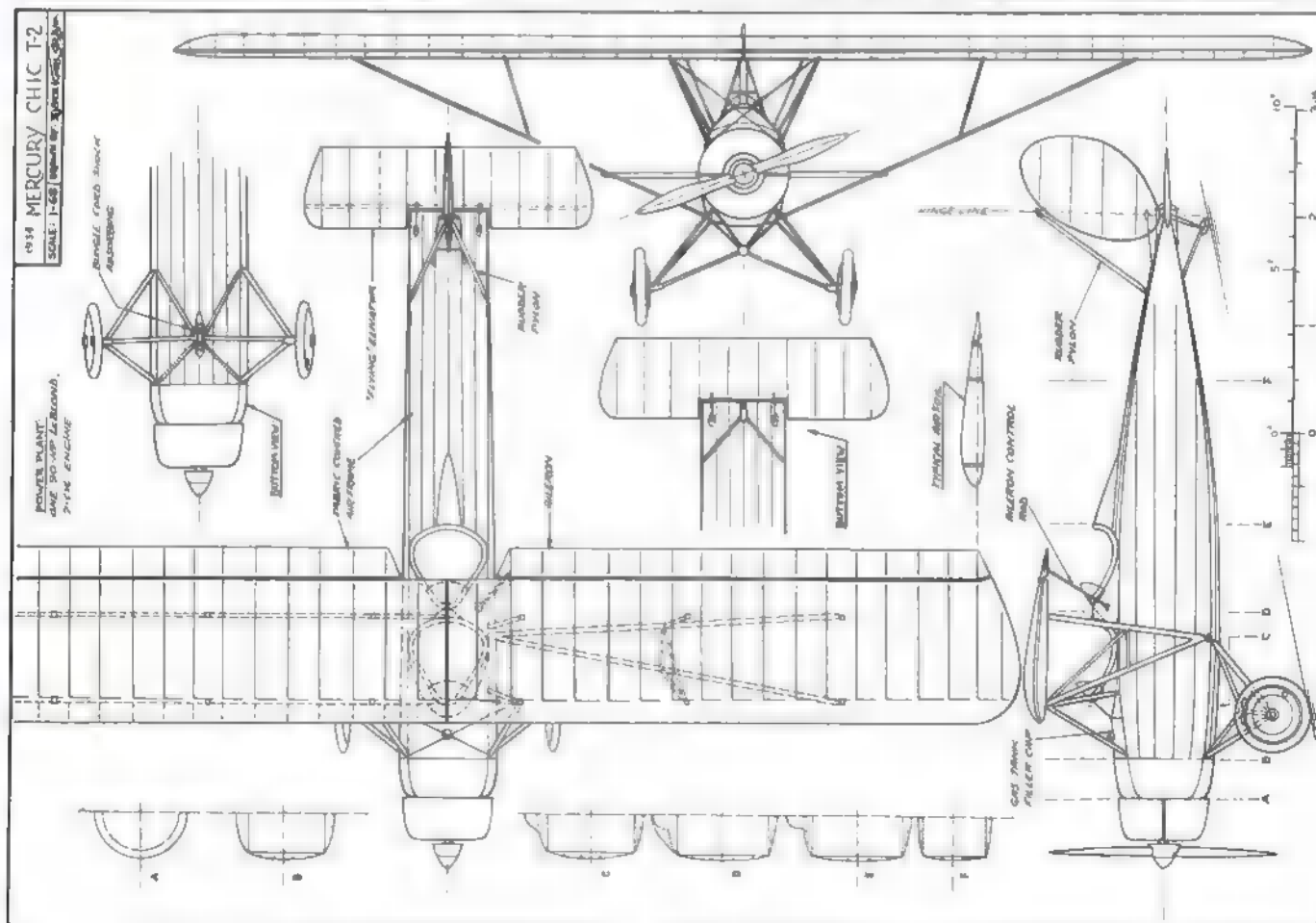
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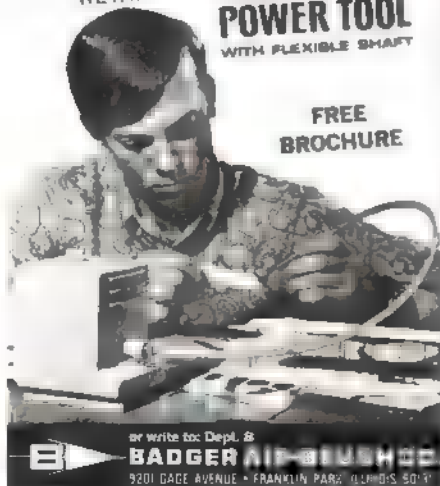
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## CONSTRUCTION NOTES

**Fuselage:** Cut out the sides from rather stiff 1/16" sheet balsa. Locate and glue F2 and F3 in place on the right side. When dry, glue the left side in place holding down with weights and/or pins. Use contact cement to add the 1/16" sheet vertical doublers between F2 and F3 and glue the 1/8" square stringers to the bottom of the sides. Glue and clamp the rudder post in place. Make sure it's vertical.

Install 2-56 blind nuts in F1 to take the .02 engine bolts and epoxy F1 in position at the indicated side and downthrust angles. Locate and glue F3A and when dry add the 1/16" sheet rear decking. Sand the bottom edge to fit the sides and use a block to sand the top edges flat.

Add the soft 1/4" sheet top to cap the deck and add the fin, being careful to align straight. Round off the corners of the deck and use plastic balsa to fillet around the base of the fin. Add the stabilizer saddle to the top of the fin and brace with a 1/4" triangular strip. Be sure there is zero degrees incidence. Add the 1/8" square strips to F1 and F2 and glue cockpit dash panel F2A in place. Add 1/16" crossgrain cockpit "floor."

Cover the forward fuse top with 1/16" pieces of soft 1/16" sheet, moistening them on the outside so they will bend without splitting. Take time to fit carefully before gluing. Add 1/4" nose doublers and install a 1/2 oz. tank or make one of thin brass. A cylinder 1 1/4" long by 7/8" diameter will give double the normal Cox tank time. (Note: if the regular Cox tank is used, the motor bulkhead F1 should be positioned 7/16" further back than shown on plans.)

Glue the 1/2" bottom nose block in place

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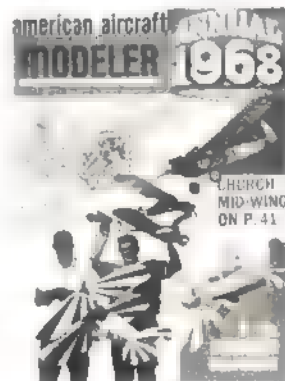
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ZIP .....



and round to shape. Carve the cheek blocks and oil cooler fairing and glue in position. Leave the bottom face of the cheeks until they can be fitted to the leading edge of the wing. Around the tank and battery compartment use foam—use white glue to avoid “melting” the foam.

Install the torque rod and finish sheeting bottom. Don't add the cut down canopy until ready to paint. Don't add the rudder until all doping is completed and dry. Keep your finish light: 1 sealer, 2 coats of clear, 2 color and one clear should do it.

**Stabilizer:** Choose light wood. The  $\frac{3}{16}$ " x  $\frac{3}{32}$ " edging helps considerably to reduce warping.

**Wing:** Locate rib notches from the plans.

Make sure the landing gear is firmly anchored. Covering was colored silk and clear dope. Again—keep it light. Attach the wing to the fuse for the addition of the back section of the oil cooler and soft block in blend in with the fuse bottom. Anchor the forward wire hold-down hooks with epoxy.

Try different wheels if the CG needs adjusting. Good luck and have a ball!

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

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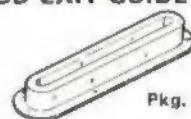
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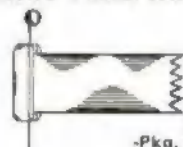


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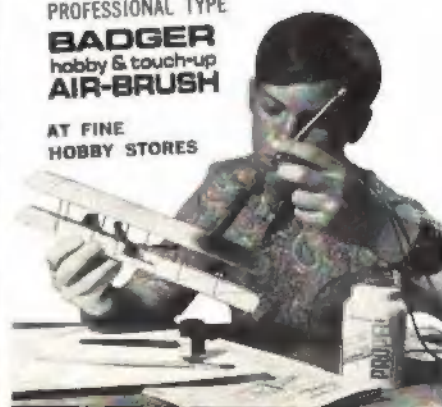
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